COAL AGE

A McGRAW-HILL PUBLICATION—ESTABLISHED 1911

DEVOTED TO THE OPERATING, TECHNICAL, AND BUSINESS PROBLEMS OF THE COAL MINING INDUSTRY

New York, April, 1930

VOLUME 35....NUMBER 4

Management and Men

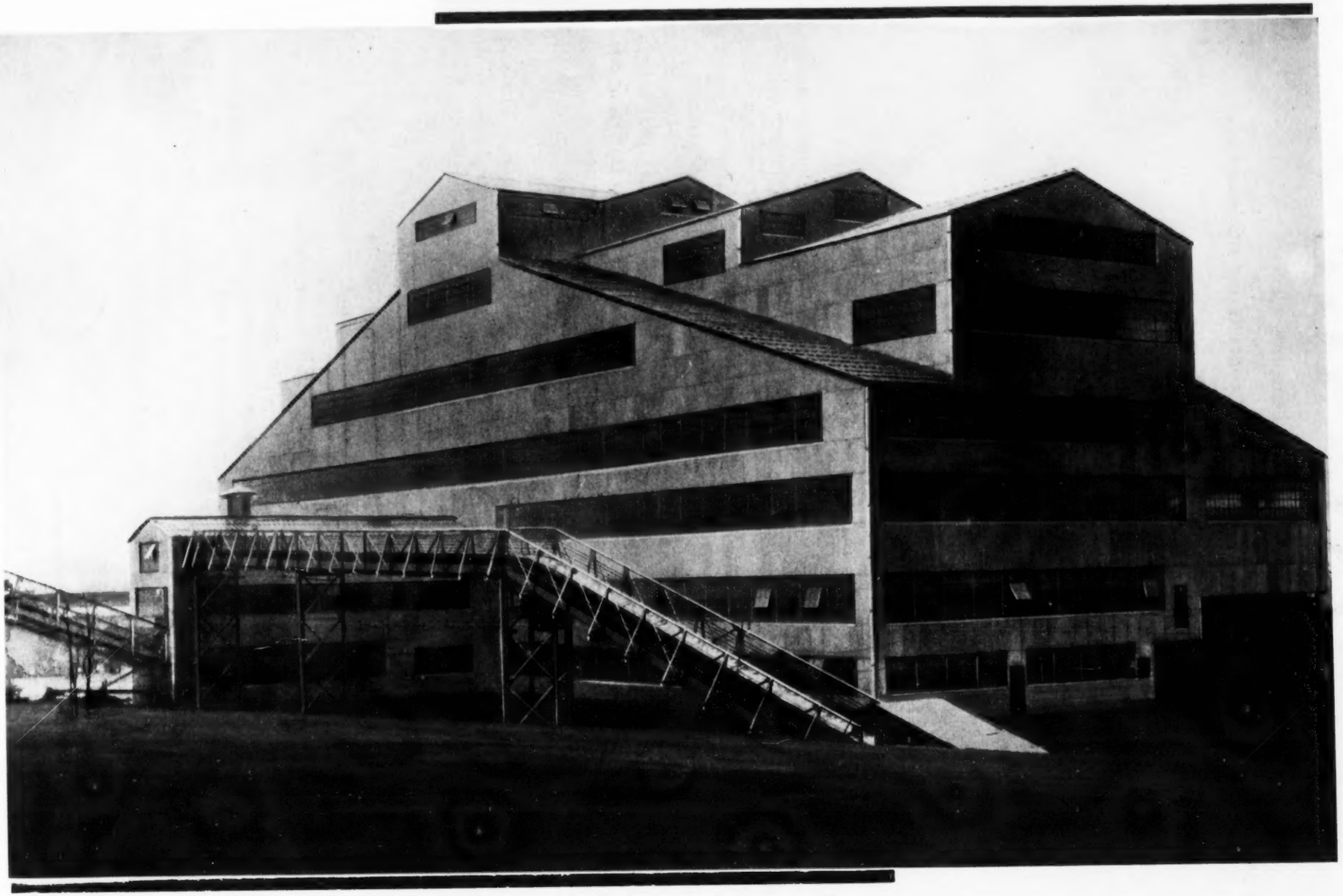
DISTRESS and unemployment following in the wake of the national Wall Street joy-ride re-emphasize the commanding place of industrial relations in a sound economic order. In the coal industry, broken running time and the unhappiness which broods over valleys of commercial depression are so commonplace that they have lost their power of catastrophic shock—but not their crushing weight.

POSSIBLY, inter-industry reactions are still too poorly synchronized to justify early expectations of complete regularization of employment. The field of industrial relations, however, is broad and offers many opportunities for profitable betterment even where the realization of ideal stability lies far in the future. There is a challenge here which progressive management in coal, as well as in industry at large, must accept.

ALTHOUGH the record is not blank in individual successes in achieving better industrial relations, for the industry as a whole the relationship cries for improvement. There is no poverty of human understanding and broad sympathy in the relations existing at many mines. The weakness lies in a failure to effect an economic relationship which would profit both men and management.

NOTABLE PROGRESS, it is true, has been made in some union fields in clarifying contractual relations and obligations. Certain non-union operators have thrown their influence against the policy of brother producers quick to take every market loss and the price of managerial inefficiency out of wages. But what has been done on a large scale in management-labor co-operation comparable with the Baltimore & Ohio shop plan or the experiment undertaken at the Naumkeag Steam Cotton Mills?

TO STEER a fair course between offensive paternalism rooted in a survival of the master-and-servant idea and the armed truce characterizing relations in militantly organized fields is not easy. But it can be done and has been done where education brings mutual tolerance and mutual understanding.

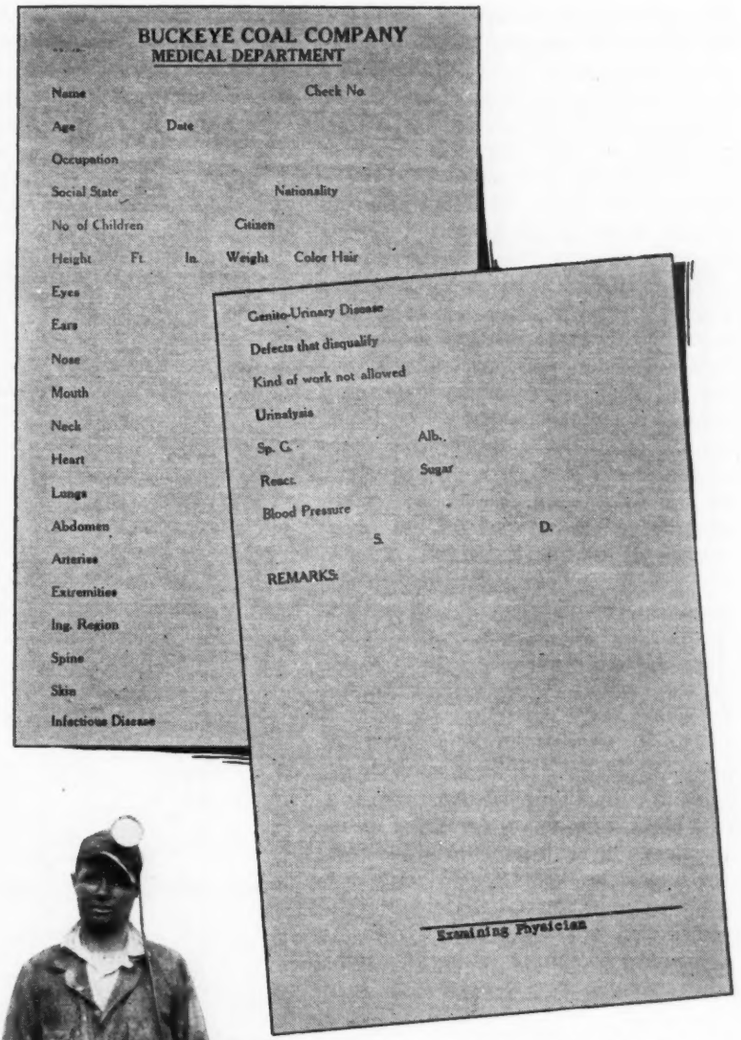


Locust Summit Central Breaker Starts Up

(See page 218)

MANAGEMENT OUTLOOK AT NEMACOLIN

+Its Relation to Labor Efficiency And Safety



Physical Fitness Is Determined by Medical Examination. Findings are Filed on This 5x8-In. Card

BUSINESS and industry are groping for more direct control of the situation in which they find themselves. Rapid expansion of operations to match equally rapid growth of demand for products and services, and consequent rises in the standards and complexities of living, seem to have outstripped human efforts to cope concurrently with all new problems. Mechanization is giving bigger incomes to some men and more leisure to others; luxuries are becoming necessities overnight; men of power and wealth are ceasing to function alone. So swiftly are human endeavors traveling today that intuition as well as statistics must be used to determine the broader trends of commerce.

Just as statistics are no more all-sufficient for pointing out broad trends, so neither can enterprise values be calculated by units of measurement comprised of only material things, as land and money, buildings and machines. A new factor, *man value,* is beginning to be recognized and reckoned with in all estimates of the worth of a project. So much is this so that a banker, when approached for the financing of a project, requires as accurate valuation of management as of potentialities for earnings. In the fields of human understanding and valuation, as related to business and industry, are hidden away resources much richer than material things. From now on, industry will progress only so far as these resources are uncovered.

Man values are no new factor in the management of the Nemacolin mine of the Buckeye Coal Co. (subsidiary of the Youngstown Sheet & Tube Co.), located in Greene County, Pennsylvania, and operating in the Pittsburgh seam. From the very start of this plant—ground was broken for it thirteen years ago—knowledge of men has been applied to its management, and records have been kept of their reactions and behavior. This has been done not casually but deliberately—as a planned function of management.

Here, the miner and his family are provided with every large advantage found in urban life: substantial and trim homes, living conveniences, health protection, and good educational facilities. Though not definitely labeled by name as such, Nemacolin is the town which was awarded first place in the merit-ranking of mining communities by the U. S. Coal Commission in 1923. The description of the best town por-

trays Nemacolin with such exactness as to leave no possible chance of mistaken identity.

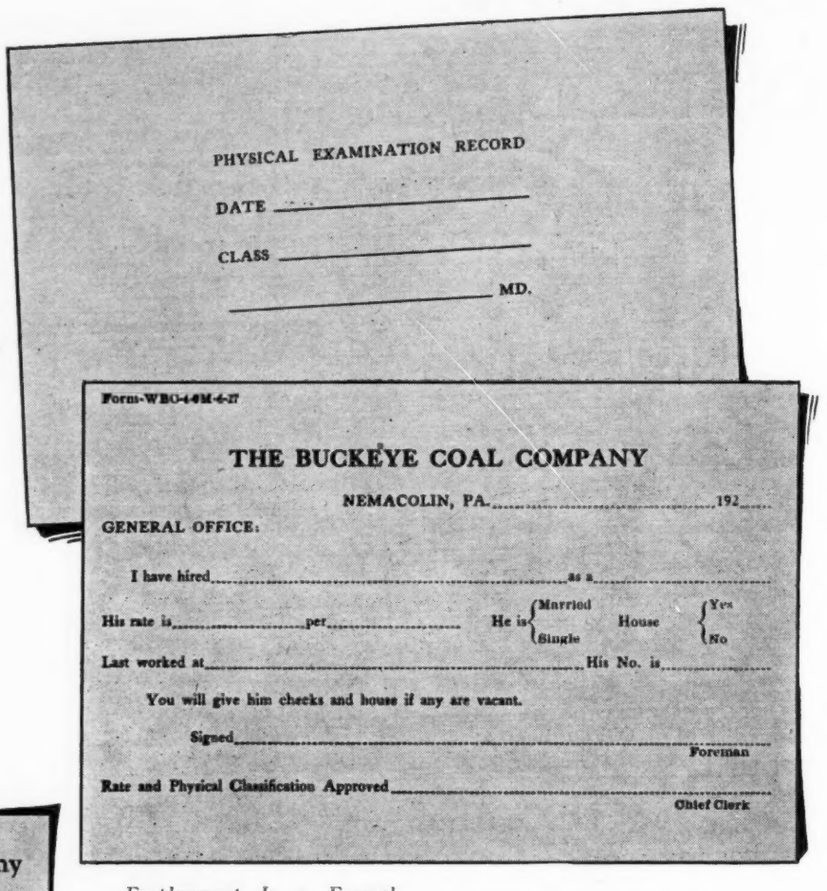
At this plant safety is a fetish which is served by all practicable measures for the protection of life. There, too, the yardstick of plant efficiency used by the local management in the directing of operation is not cost per ton. In the current gaging of plant efficiency, the basis is human productivity—in tons per man-shift—with due regard for safety to health and limb. It is not to be inferred from this that cost-keeping is neglected; to the contrary, it is kept up accurately from day to day. As a matter of fact, the management knows every day, two hours after starting, what the exact labor costs were the day before. The money basis is used only indirectly at the plant for checking against human accomplishments. However, the money basis naturally must be used in place of man values in rendering accounts to the parent company.

Man values *cannot* be gaged intelligently in dollars and cents. As applied by the immediate management of a plant, a monetary system of measurement of achievement is indirect, for under the dollar are hidden many complex man factors that in the abstract defy analysis. It is far easier to convert productive units into monetary terms than it is to reverse the translation. Each system has its transcendent place: productive units for the plant management; money units for the investor.

When a new man applies for a job, if accepted by the mine foreman after the customary interview, he is required to take a thorough physical examination in the company hospital. The examining physician rates him in one of a number of alphabetical grades according to his physical fitness. To receive the grade of "A" a man has to be in practically perfect health. Grade "B" is accorded those in average to better than average health. No man is employed underground who falls below grade "B".

If the applicant does not pass the physical examination, he is advised by the doctor as to just where he has failed and told how this handicap can be overcome, if possible, and for what work he is physically qualified. This is another example of management interest in the individual. Having passed the physical examination, he must fill out an employment card, giving his job history for the last few years. This card folds in two and, when filed away, serves as a pocket for holding other cards and slips devoted to his performance as a worker and his behavior as a citizen of the community. A record of his earnings through a term of years is kept on the master file card.

These records enable the management to pass judgment on the man more unerringly in the event he is considered for discharge or promotion, or if he asks a favor. As an example, when a man comes to see the superintendent, to ask a favor or make a complaint, the superintendent glances over the record and receives valuable aid in dealing with the man's problem.


PHYSICAL EXAMINATION RECORD

DATE _____

CLASS _____

_____ MD.

Form-WBC-44M-6-27

THE BUCKEYE COAL COMPANY

NEMACOLIN, PA. _____ 192__

GENERAL OFFICE:

I have hired _____ as a _____

His rate is _____ per _____ He is {Married / Single} House {Yes / No}

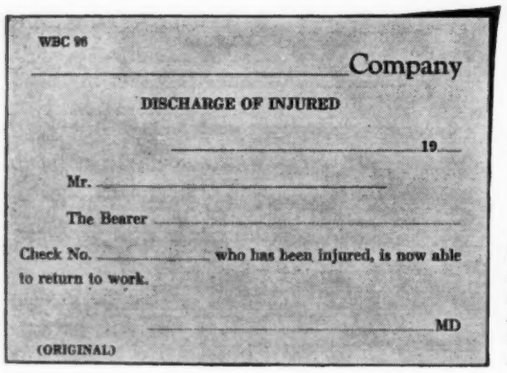
Last worked at _____ His No. is _____

You will give him checks and house if any are vacant.

Signed _____ Foreman

Rate and Physical Classification Approved _____ Chief Clerk

Employment Is a Formal Process Which Begins With Presentation at the General Office of a Hiring Order Signed by the Foreman. This Order Form Is 5⅜ x 3⅜ Inches.


WBC 96

_____ Company

DISCHARGE OF INJURED

_____ 19__

Mr. _____

The Bearer _____

Check No. _____ who has been injured, is now able to return to work.

_____ MD

(ORIGINAL)

Workers Must Present a Release Order Signed by the Plant Physician Before Resuming Work After Disability. This Release Form Measures 3 5/16 x 4 9/16 Inches.

At Nemacolin, it is the aim to take every precaution possible to insure safety. New men are required to take a course covering company rules and policies. Safety is a part of their education which in almost every case they accept of their own volition. Only recently, Nemacolin was given an award by the Bureau of Mines for 100 per cent first-aid training. Sixty-four men, many of whom are employed in no official capacity, volunteered and took part in training the mass of workers. Training in first aid and mine rescue is done on company time. Sixty-eight of the eleven hundred men on the payroll are trained in mine rescue work, many of them having had experience in mine rescue work at mine disasters. This work is supervised by a safety engineer.

Ten complete sets of oxygen-

breathing mine rescue apparatus are maintained for emergency use, with sufficient Burrell all-service gas masks and self-rescuers in reserve. The local rescue station is equipped with many modern safety appliances and its general layout is as adequate as any in the mining fields.

It is of interest to note that in 1929, of two first-aid teams from Nemacolin attending the state meet held at Ebensburg, Pa., one team took first prize and received a beautiful cup presented by Charles M. Schwab, the second team taking fourth position; also, in the same year, a combination mine rescue and first-aid team placed third in the International meet at Kansas City, Mo., and was the leading Pennsylvania representative.

SAFETY records are kept of every employee, this being a duty of the safety engineer. Each man is interrogated as to his attitude on safety and his accident record before coming to Nemacolin. Injured men, no matter how slight the disability, are required by the company to stay off their job for the full period required until discharged by the doctor. Sometimes this is not easy, for the steady worker dislikes to lose working time. Also, it requires restraint on the company's part, as the man's place is unfilled and the no-lost-time record is marred. On the other hand, the practice lessens the likelihood of a backset to the injury and inadvertently serves as a penalty which all men try to avoid by being careful.

Underground workers are being persuaded to wear safety goggles, where they are practicable, and safety shoes; all mine employees carry self-rescuers. The carrying of self-rescuers is compulsory for any individual underground, whether employee or visitor. Wearing of safety shoes and goggles is being made more of a custom than a requirement, since the company wants to see this equipment in use and introduced it through persuasion and education only, as the management does not believe in foisting these articles on the men.

Nemacolin is now producing an average of about 6,500 tons a day. The average daily tonnages produced have been steadily increasing from 5,750 in 1927 to 6,500 in 1929, with a total of 1,715,000 tons for 1929. For the getting of this tonnage safely and efficiently, close supervision is maintained. The supervisory force consists of the mine foreman, two general assistants, eight day-shift section foremen, and eight firebosses on each shift.

All foremen belong to the Nemacolin foremanship organization, which meets once a month. This body elects its officers and functions entirely by itself. The safety engineer attends the meetings, but he does not participate in the discussions. He is expected merely to prompt the presiding officer in the bests interests of the higher management.

Usually, only one problem is discussed at a meeting. The statement of the problem is furnished by the superintendent and is of a practical nature relating directly to the plant. The purpose of this meeting is not alone to train men in the technique of their jobs but to develop a closer understanding between the foremen as well as the further object of teaching the foremen public speaking and of imparting confidence and poise.

On to the Lamphouse

There is yet another organization at this plant, known as the Central Safety Committee. It is composed of the heads of departments—the superintendent, who presides; the chief engineer, the mine foreman, the general outside foreman, the safety engineer, and the master mechanic.

Many of the subjects are in the form of recommendations which are reported on. Various questions are taken up and recommendations drafted. Frequently an investigation is required which is reported at the following meeting. Reports on certain phases of operation are repeated in every meeting, as, for example, the condition of fire-fighting equipment and the explosives cars. The superintendent always interjects into the meeting a detailed account of some operating method or procedure—perhaps rock-dusting, ventilation, machine or electrical inspection—which means that the man or men in charge of the operation covered must be prepared to give a complete report at the next meeting.

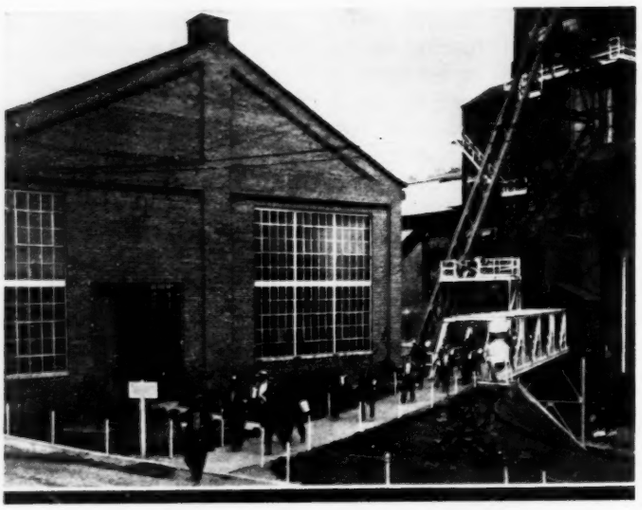
Meetings of both these bodies are not looked upon as mere routine; they are serious affairs, conducted with parliamentary decorum. One of these meetings may last for hours.

GOOD foremanship teaches that the boss who plans and keeps his men busy all of the time, daymen included, is respected; whereas the easy-going, listless type is held in little esteem. At this mine the bosses keep the men working steadily, but never force them beyond a normal rate. Working at a pace higher than normal is feverish activity and tends to accentuate the hazards of mining and cause abandonment of safety precautions.

Underground efficiencies are high at Nemacolin and yet the men work no faster or harder than elsewhere, because delays have been reduced to a minimum. Rarely does a miner have to wait for a mine car and supplies are always available for his needs. Furthermore, the management attempts to facilitate the job of loading coal to the degree where the man produces a satisfactory output and makes a good living, yet gets away from the mine at quitting time or earlier.

At Nemacolin, every man, whether he be paid a flat or a piece rate, is cherished for his human qualities. A man is a man; he is given utmost consideration regardless of his job. And the door of the executives' office is always open to him. Heads of departments have grown to think of their men first and themselves last.

Positions of official character are given only to men who have proved their reliability. The assumption is made that they are capable of filling the place and are given the necessary, well-defined authority. Within his



Every Effort Is Made to Enable Men to Leave the Mine on Time

sphere, each boss is expected to spend his time planning and supervising while the men under him execute the details. In this way, every man is being taught the job of his superior. With rare exceptions, all vacancies are filled by men in the organization.

Snap judgment has been divorced entirely from the functioning of the management. It is realized that mining of coal is too precarious an undertaking for toleration of any but sound judgment. When a decision is to be made, all whose opinions are desired are called together in one or more meetings and the matter thrashed out. Pressing problems are hammered at day after day until a satisfactory decision is reached. Where quick action is unnecessary, more time is taken. In all matters pending decision, the unwritten rule is to move according to the exigency of the occasion.

Red tape is taboo. Each man knows where he stands and how to get action with the least effort and in the shortest time. This means, of course, that management control is largely decentralized.

Observations of this management are that fluctuating and low wages will disrupt an organization, lower the efficiency and, contrary to general belief, increase absenteeism.

Consideration for the desires of the men and their families is always uppermost in the mind of the management. Action is taken to supply those desires and wants, but in no case is action motivated by philanthropic impulses. A mutual understanding exists between the people and the management.

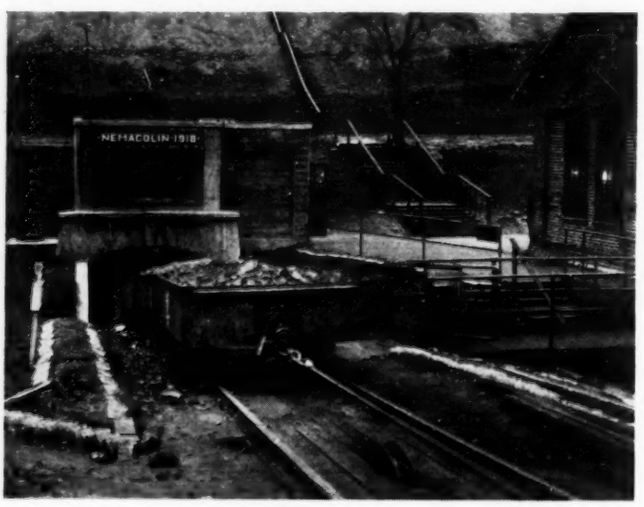
In the early days there was need for a new school in the town, but the township was unable to push this educational project, because of a lack of funds. The company engaged an architect, financed the building, arranging for repayment over a five-year period, and directed the construction. There are eleven children from the town of Nemacolin in college this year. Many of them are working their way through.

THERE are 21 teachers in the Nemacolin elementary school, who, in addition to teaching, are helping to mold the characters of the more than eight hundred children who daily pass through the doors of their temple of learning. There are 78 children from the town of Nemacolin attending the Cumberland Township High School, which is located near the Borough of Carmichaels, a distance of three miles from Nemacolin the children being transported to and from school in well equipped buses provided by the school board.

Nemacolin has earned country-wide recognition as a great coal-mining operation. Frequently the question is asked, "What are the policies that make it great?" The general policies are here given. The company is engaged in *human engineering.* It is investing in people as well as in a plant.

In the early development of the Nemacolin mine and community, a great deal of time and study was given to the construction of this plant and the houses, with a view of having proper mining and living conditions for the workmen. This company believes that returns in loyalty, as well as output of coal, far exceed expenditures in handling the mining game in a human way.

Slope Portal at Nemacolin Through Which Rock, Materials, and Supplies Are Handled



IN ANTHRACITE REGION

+Machines Make Low Coal Minable And Water Tunnels Feasible

By R. DAWSON HALL
Engineering Editor, Coal Age

MECHANIZATION is unostentatiously making progress in the anthracite region, and that progress, though not exclusively exhibited in low coal, is most in evidence where the seams are thin. Stillwater mine, an operation of the Hudson Coal Co., in the extreme north of the Northern anthracite field, exemplifies this comparatively recent development in hard-coal practice. The coal area which is being worked is under a relatively light cover—about 100 ft. The mine produces around 500 short tons daily. On being brought to the surface the coal is transported over an extremely rough terrain a distance of about 3,000 ft. by an American Steel & Wire Co. aerial tram to a tipple. At this point it is loaded onto railroad cars, which transport it to the Coalbrook breaker, where it is prepared for the market.

The coal is 28 in. thick, but has beneath it 4 in. of bone. A 6-in. kerf is cut beneath the seam, partly in the 4 in. of bone and partly in the clean coal above it. The coal seam is of excellent quality and has some slips in it, but no regular face. The slips run in all directions, and the coal is gnarly and not blocky, like bituminous coal. It hangs tight to the roof, from which it must be torn by shooting.

Where the coal is being mined in chambers by the aid of Eickhoff conveyors, these chambers are on 50-ft. centers, are 24 to 28 ft. wide, and 300 ft. long, and of coal height. No rock is removed. The conveyors are 10 in. wide at the bottom, with flaring sides, and are driven by 7½-hp. electric units. They are set on the center line of the chamber. In thin coal, a conveyor should not be too wide or too heavy unless a large tonnage per unit has to be handled. Such a tonnage is not provided by a single room, so a light conveyor amply suffices. It is less costly to purchase, less laboriously and less expensively extended, and consequently more desirable in all repects. It can be driven with less power and by a unit that costs less to install, for the concrete foundation needed for a heavy driving unit need not be provided. The floor of the rooms in the Stillwater mine is strong enough to keep the machine in place if it is held by steel screw jacks firmly braced against the roof. Swivel pans are provided on the end of the conveyor, so that very little shifting of the coal is necessary.

When a chamber is started the setup is made 30 to 50 ft. from the gangway. To drive this chamber over 300 ft., the drive must be moved back into the chambers from 100 to 150 ft. The drive is capable of handling 300 ft. of chute in either direction without buckling.

In order to advance the work rapidly, the cutting machine starts its cut on one side of the room as soon as the coal on that side is loaded into the conveyor. Concurrently, loading commences on the other side. To each chamber are apportioned four men: One a carman who operates the shaking engine and loads the cars, topping them so as to provide for a good capacity; one a machine runner who usually is in charge of the gang, and two laborers who load the coal into the conveyor. Each gang produces about 38 short tons per shift. As there are two shifts, each room produces about 76 short tons, and the four rooms, have an output of 304 tons daily.

Gravity favors the flow of coal from the face to the car, the gradient being between 2 and 3 per cent. As height has to be made in the gangway for the mine cars, bottom is lifted, and the conveyor accordingly comes to the desired height above the top of the car without any terminal upgrade.

In another part of the mine a longwall scoop face is being prepared with an Eickhoff conveyor. The gangway intersects a tail-rope haulage plane, and a longwall place is being started sufficiently far back of the plane to afford it a pillar 50 ft. wide, for protection. As the plane is inclined at an angle of much less than a right angle to the gangway, the room, being driven to open up the longwall face, is inclined in that same direction. It will be extended till about 350 ft. long, with the aid of a 12-in. conveyor pan actuated by a 7½-hp. M T 8 Eickhoff drive. When the conveyor has been extended about 300 ft. in length, the driving units will be moved up 200 ft., so that the impulse will not be at one end and thus will not have to be transmitted for the full length of the conveyor. The pans, being light and narrow, might buckle if that were done.

As soon as the place is driven up, the room will be swung at the far end, so that it will be vertical to the gangway and then it will be bent a little further, so as to produce a convex rib—the kind of rib desirable for scraper loading. When the rib is convex, the scraper in trying to go straight tends always to collide with it and in so doing gathers the loosened coal from its foot. As soon as the correct shape of rib is provided, the scraper will be introduced, and the Eickhoff conveyor will return to chamber work. In fact, it is the intention not only to put this conveyor

back to room work but to place three more in similar locations.

Water-tunnel construction by no means has come to an end in the anthracite region especially, in the Eastern Middle Field, which centers around Hazleton. It also has become a mechanized activity.

The Lehigh & Wilkes-Barre Coal Co. has had two Myers-Whaley shovels working on the 19,000-ft. tunnel from Audenried to Catawissa Valley. This tunnel runs more or less parallel with the strike of the measures on a gradient of 0.17 per cent. Owing to water conditions, only one of the shovels is operating at present.

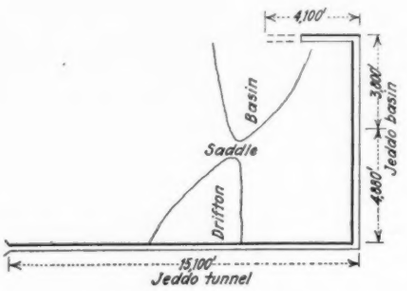
Another water tunnel that is particularly interesting, because of its novel form of mechanization, is that being driven from the Jeddo-Highland Coal Co.'s Highland No. 5 mine to Coxe Brothers & Co.'s mine at Drifton. Now that the latter company has been absorbed by the Jeddo-Highland Coal Co., arrangements are being made to drain the Drifton mine through the Jeddo tunnel, and a Sullivan drag or hoe has been installed to load the rock into mine cars. A few words as to the tunnel may well preface reference to its mechanization.

The Jeddo tunnel is 15,100 ft. long. It is constructed under the Black Creek Ridge saddle or anticline, which lies between the Drifton and Jeddo basins. It cuts deeply into the Pottsville Conglomerate rocks.

AT the time the Jeddo tunnel was constructed, another tunnel was excavated about at right angles to it. This followed along the Jeddo basin. At that time it was driven 4,880 ft., but later it was extended a further 3,800 ft., making its total length 8,680 ft. Now, after a delay of years, a tunnel about at right angles to the latter tunnel is being constructed back from the Jeddo basin to the Drifton basin, which, at first blush, seems a strange proceeding. The reason is that the Drifton basin is not a simple structure but has a saddle or cross-anticline over which water has now to be pumped at much expense. After the tunnel is completed to Drifton, the water will travel from the Drifton basin down to the Jeddo basin, down that basin to the Jeddo tunnel, which will carry it back to the Drifton basin and out by the tunnel opening.

The gradient of the original tunnels was 0.333 per cent. The inclination was not at all based on the fall necessary to carry a sufficient volume of water in a rock channel of the size constructed but rather on the inclination needed to prevent silting. Though a grade of 1 ft. in 300 will not altogether prevent this action, it is just steep enough that during periods of freshet the floods of water will sweep out any silt that has been deposited during low water. The tunnel therefore is self-cleaning.

In the new tunnel the gradient will be 0.422 per cent. As there is water at the Drifton approach of the tunnel which would flood the latter if driven from that end, the excavation is confined to the Jeddo, or Highland No. 5, approach. The tunnel passes through the Pottsville Conglomerate, which is a rock that can be tunneled only with difficulty. It is not possible to advance in conglomerate rock at record speed. The maximum rate of advance with mechanical aid and triple shift, working, as stated, at one end only, is about 85 yards a month, but in general it has been more nearly 60. The cross-section is 8x12 ft., the height having been slightly increased to aid mechanical mucking.



Sketch of Jeddo Tunnel and Connections

The Pottsville Conglomerate here and there has a little red shale, but that is quite occasional, and still more occasional are small beds of quartz. But eternal is the hard, pebbly rock, with here and there a welling spring of clear water, which, however, usually coats with red stains the walls it travels over. The anticline between the basins apparently has been passed; at least the measures are now dipping. Some 2,500 ft. of tunnel has been driven out of above 4,100 ft.

Differing from the ordinary scraper such as is generally used for loading coal, the hoe or drag drops from above on the material to be scraped. That is why it here is termed a hoe. It has no handle, of course, but it is pulled back and forth by ropes. Provision is made for the raising and lowering of the hoe by putting the sheave by which the rear rope is operated as near the roof as possible. The weight of the hoe causes it to fall on the material to be hoed as soon as the strain on the rope is released. As it is drawn forward it engages more and more of the material till it is fully loaded.

Much as with the ordinary scraper loader, there is an inclined plane that is pushed to the loading point, in this instance by the gathering locomotive, and there is, moreover, an overhanging frame that surmounts the mine car. This frame, having mere side runners and no bottom, supports the hoe but lets the rock fall through the opening into the car below.

At Highland No. 5 the cars are large, being 5 ft. 3 in. high and running on a 4 ft. 8½-in. track. They hold, water level, 147½ cu.ft. Each of these cars is filled in from perhaps 13 to 16 complete trips of the shovel. A trip takes about half a minute; that is, a car is filled in from 7 to 11 minutes.

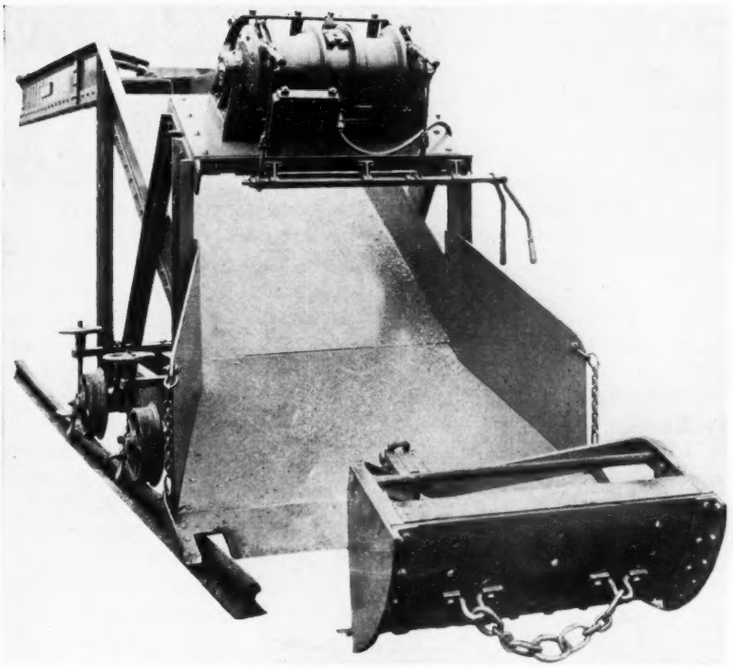
But the work of loading is not so simple as this would suggest. Such large and violent shots are fired that the rock is thrown for a distance of about 400 ft. This material is not only rock of dimensions but fines that pack somewhat harder than sea sand, and shovel with difficulty.

Consequently, the job of mucking includes making the rails clean enough for the passage of cars and machine. This may take a half hour. It is surprising how readily and how stiffly the fine conglomerate sand will pack, whether carried down the gangway by a blast or deposited by the waters of the tunnel.

APART from the preliminary hand loading of material that fails on the rails, though the latter do not approach the face nearer than 30 ft., the cleaning up consumes about 2½ hours. However, the time between placing and removing the portable incline before and after loading has been at times as short as 1½ hours.

To ventilate the tunnel which has been driven in rock without a return airway for a distance of 2,500 ft., a 30-in. Universal blower has been installed which exhausts the air through an 18-in. galvanized-iron pipe, the forward end of which has to be kept some 100 ft. away from face of the tunnel because of the violence of the shots. In order that the body of the pipe may fit together tightly, a length of pipe is reserved for the inby end and is used for that purpose only. Its rim shows the violence to which it is subjected every time shots are fired.

Using the fan as an exhaust, the air, when it has been befouled by the



Drag or Hoe That Loads Rock in the Tunnel to Drifton Mine

explosion, is removed in the pipe and does not hang around the tracks. The ventilation pipe is suspended from the roof. A blower or booster fan is being installed in the line about 1,500 ft. from the first fan, to assist it in drawing out the foul air. The pipes are connected much like those of an ordinary stove pipe and rest on hooks set in the rock rib of the tunnel.

As soon as the air current has cleared the tunnel sufficiently to permit men to enter it, they begin to load up—into a car, pushed in by the attendant locomotive—the rock blown over the tracks by the blast. Meantime, a man has gone to the end of the tunnel and scaled off the loose rock in the roof and on the sides and face. That done, he takes a water Leyner drill and proceeds to drill three holes in the face as near to the roof of the tunnel as possible, one near the right rib, one near the left, and one in the center. These he sinks to a depth of about 18 in.

Into these holes are in turn driven wedges which hold the face sheave, thus providing for the rearward movement of the hoe. By the time the holes are drilled, the men have cleaned up the loose rock and the rock sludge from around the rail, and the locomotive has pushed the inclined plane into place and the crew has attached it to the rail by clevices. The work of mechanical loading then commences at say the right-hand corner of the face; the rock being generously bespread for the whole 30 ft. between the face and the loading incline. As occasion requires, the sheave is moved over to the center and then to the left rib hole till all the rock is cleaned up.

During the inevitable delays awaiting the placing of cars, the drag is worked on short runs between the face of the tunnel and a point immediately in front of the incline. The heavy rock, of course, has fallen near the face and is imbedded in finer material. Consequently, the greatest resistance is experienced at that point and it is desirable that this débris be moved during the spells between actual loadings, so that pieces too large for the drag or too deeply imbedded may be worked out into open where they can be sledged if necessary.

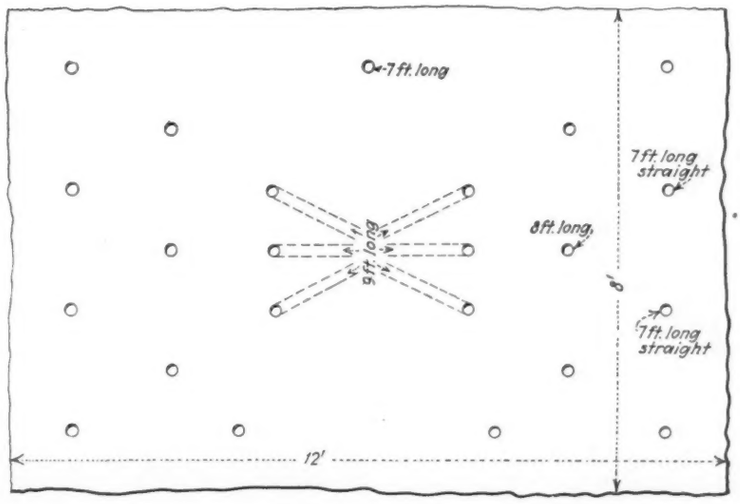
As with all scraping operations, the equipment does not remove all the rubbish, its work being most effective near the face, but all that is needed, and that only near the ribs, is for someone to throw over or drag the small quantity of rock that is beyond the range of the hoe into its path, a much lighter operation by far than lifting it up into a car that stands 63 in. above the rail and some feet back.

In order to prevent the scraper from piling rock at the sides of the shovel, steel-plate wings are bolted on either side of the flared foot of the incline, which together fill out the full width of the bottom of the tunnel and so intercept any rock that may tend to go astray, turning it in the desired direction. Some of the rock at this point, of course, must be thrown over into the path of the shovel.

An entire working shift used to be devoted to the work of mucking a 6-ft. cut. Now it takes at most 3 hours. The speed made now is almost double that attained with hand loading, though the cross-section of the tunnel has had to be made larger to accommodate the equipment. At present six men are working at the face, one of whom runs the machine. A seventh man operates the locomotive.

Three shotholes are drilled in the top of the face. Four shotholes are drilled in a row near the bottom. There are two holes near each rib in line with the left and right top and bottom holes, respectively. All these holes are drilled straight in for a distance of 7 ft. They are loaded

Shooting Diagram of the New Tunnel to Drifton; Center Holes Shot First



with 7 sticks of 60 per cent gelatine dynamite. There is an inner ring of six holes, also drilled straight in for a distance of 8 ft. and loaded with 8 or 9 sticks of the same explosive. The center six holes are 9 ft. long and they are driven to meet at the rear. They are charged with 12 or 15 sticks. Delay fuses are used, electrically fired, arranged so that the center shots fire first. In all there are 24 holes.

Another company that has entered what is, for the anthracite region, a new field in loading is the George F. Lee Coal Co. At its Chauncey Colliery it has installed four Northern pit-car loaders, one in coal and three in rock and coal. The latter are being used in the driving of gangways in seams of coal so thin that about 70 per cent of the material moved is rock and only 30 per cent coal.

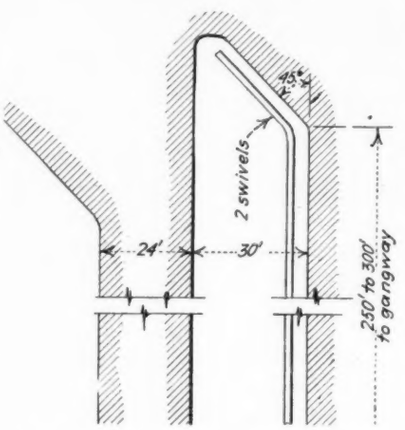
The pit-car loader was not originally designed for rock, and some changes have been made which have resulted in bettered service. Among these are angle irons set on the end of the loading platform and so arranged as to prevent rock from wedging between the flights and the nose of the machine. Saw teeth $\frac{1}{2}$ in. high and $\frac{5}{8}$ in. between points have been provided on the flights. These prevent the rock from sliding back. The framework also has been strengthened. As a result, the machine is able to handle almost anything two men can load on it. So successful has the George F. Lee Coal Co. been in the operations of these loaders that several other anthracite companies are preparing to use them or already have them installed.

IN ORDER to assist in loading the coal, No. 16 gage steel shoveling plates are laid on the floor of the gangway before shooting the coal or rock. Maximum efficiency is obtained where it is possible to use one coal loader in two places. One of these places can be shot about an hour before the men are ready to load it out. While the air is clearing they can complete the loading in the other place. One miner and his helper does the drilling for the two gangways. There are three muckers to each machine.

The headings are driven 6 ft. 2 in. clear of the rail. To that must be added another 8 in. for the track and on one side about 1 ft. for the inclination of the coal seam. So the average minimum height in the clear is 7 ft. 4 in., of which 30 in. is coal and the rest, or 58 in., is rock. As a rule, there is more than the 58 in. of rock to handle, for the roof does not always fall to the specified height. The cars hold 100 cu.ft. level full.

One machine when working between 3 and 11 p.m. loaded 100 cars of rock and 15 of coal in 17 days. Working between 11 p.m. and 7 a.m. it loaded 110 cars of rock and 25 of coal in the same period. It was working steadily on two gangways. It is stated that in general when loading by hand the cost was $36 per yard and that with the loader the cost has been lowered to $20, a saving of $16.

A big advantage in the semi-mechanical loading is the greater rapidity with which a gangway can be advanced. In the past the development in 30-in. coal was so slow that no capacity could be obtained.



Diagonal Face Gives Bigger Tonnage and Fewer Conveyor Flittings

The management was always clamoring for more tonnage. The roadways advanced so slowly and delivered such a small output when advanced that a fair colliery tonnage was impossible. Hence it is interesting to note that at Chauncey Colliery with 66 per cent more men in a gangway (five instead of three) 150 per cent more advance was made with the Northern loader than when working by hand.

In *Coal Age* of December, 1927, Vol. 32, p. 333, was described the work of the George F. Lee Coal Co. with Siemens-Schukertwerke and Eickhoff conveyors. To this there is not much to add at this time. Both types of conveyors are being used with satisfaction, the Eickhoff conveyors taking the coal from what perhaps I may be pardoned for terming the S-S conveyors. In many cases the latter are delivering coal direct from the face to the gangway and some are lifting coal up a 4-deg. pitch. Three S-S conveyors sometimes deliver to a fourth unit of the same size and would tax its capacity except that no more than two are delivering coal to the receiving conveyor at any one time. Twelve S-S conveyors are delivering coal from twelve chambers to two Eickhoffs, but of the six delivering to any one Eickhoff, only three are furnishing coal at any one time, the other three being in places where, at the moment, shots are being loaded and fired. The superintendent and foremen are enthusiastic about mechanical loading. With coal as low as 30 in. and markets as they are, it is mechanize or close down, and the Chauncey Colliery is one of the very few in the anthracite region that, by reason of mechanization and good marketing methods, run steadily.

Experience has merely increased the conviction of the Scranton Coal Co. that mechanization is desirable. In the March, 1928, issue of *Coal Age*, Vol. 33, p. 167, the home-made shaking chutes of this company, working in 18-in. coal, were described, and they are still working and giving satisfaction.

But at the Raymond Colliery of the company there is some virgin coal in the New County, or Rider No. 2, bed running from 36 to 44 in. in thickness which will be mined by room-and-pillar methods with 30-ft. chambers and 24-ft. pillars. It is noteworthy that the coal will be cut with Sullivan and Jeffrey undercutting machines to a depth of 5½ ft. and then loaded by hand into Eickhoff conveyors with driving units like those in use at Stillwater, and pans 10-in. wide below the flared sides.

THE point of most interest is that the face will not be square to the center line of the room but at an angle of 45 deg. This will give a longer face, increasing the tonnage obtainable before a readjustment in location of the conveyor will become necessary and augmenting the production per conveyor. Though the room is only 30 ft. wide, the face will be 42 ft. long. By lengthening the face the cost of the conveyor per ton of production is reduced. There will be two swivels on the conveyors.

These are a few only of the many companies in the anthracite region that are becoming actively interested in mechanization. In fact, there is hardly an important company that has not made some movement in that direction, and some of the companies already mentioned are about to mechanize their mines further, spurred on by their own experience as to the ability of machinery to reduce costs.

CO-ORDINATE MEN AND MACHINERY

A MAJOR PROBLEM in modern coal mining is the co-ordination of men and machinery. The increased use of underground loading machines is eliminating hand labor, but it is not eliminating men. It is requiring a different class of labor—a combination of miner and mechanic.

The personnel for the modern mine must come from one of two sources: a mechanic must be trained for underground work, or the miner must be trained to use and operate machines. Since there are now available in the coal-mining industry capable and competent workmen at present untrained in the use of the machine, but who are adaptable to machine operation, the present problem is to determine the best method of training.

One of the first steps is to convince the men of the practicability of the machine idea; to convince them that it is possible for them to use mechanical appliances underground; and to further convince them that machine work is more pleasant and that it is equally profitable to them and to the company. In other words, the men must be made "machine-minded."

At those mines where mechanization has eliminated hand methods, it has been found that the men are not antagonistic. It is true that at first there is a general disinclination to change from familiar to new methods, but this applies more to the older than to the younger men. It has been found that once the machine has been successfully demonstrated there is a desire on the part of the more progressive men to be employed on the machine loading crews. Such men are very valuable to their companies, and their ideas and suggestions have frequently contributed very greatly to the success of the operation.

Mechanized loading for modern mining has not reached the point of standardization, but it has reached the point where it is known definitely that some form of training for the mechanical crew is highly desirable, if not of prime necessity. It is to the company's advantage to have a system of training men inaugurated by the company, rather than to have the men train and teach themselves, by experience, at the company's expense. It will be clearly shown at the Cincinnati convention that this is particularly true, since mechanical development has now demonstrated that there are certain right and wrong ways of using equipment.

The objective in training men is to bring about two things: safety and efficiency. Under the new methods, with groups working under close supervision, discipline can be inforced and where practices have been found correct these practices can be employed at the discretion of the company and not at the discretion of the individual miner. However, it is highly important that in formulating these rules and practices the operating companies should first know that their rules are correct, and it is by co-operation between mechanized companies and by comparing various practices, such as will be made possible at the forthcoming convention, that the best rules will be more quickly obtained.

The American Mining Congress convention and exposition offer a splendid opportunity to bring out information on this important subject. The safety factor, increasingly important with the advent of mechanization, depends for its success upon the proper training of the men; upon the development and employment of the "care-means-safety" idea. The convention and the work of the American Mining Congress have done more than any other single factor in the industry to cause the men to think in the terms of the machine.

The creation of the new term "mechanical-mindedness," an adherence to approved practice, and the adoption of safety codes are real and vital problems facing the coal operator.

P. C. Thomas

Chairman, Program Committee, A.M.C. Cincinnati Convention

WHY GO TO CINCINNATI?

+ Fellowship, Exposition, and Talks Promise Profit, Say Committeemen

BROADER ACQUAINTANCESHIP and exchange of experience with other men in the industry and a wider knowledge of the latest and best in equipment are seen as compelling reasons for attendance at the Seventh Annual Convention of Practical Coal Operating Officials and National Exposition of Coal-Mining Equipment, to be held at Cincinnati, Ohio, May 5-9, under the auspices of the Manufacturers' Division of the American Mining Congress. The views expressed are responsive to an inquiry addressed to members of the program committee of the convention by *Coal Age*.

Several members of the operating department and one representative for the engineering department, another for the safety division, and one from the purchasing department of each company should attend the Cincinnati convention, in the opinion of S. W. Blakslee, general manager, Pennsylvania Coal & Coke Corporation. These representatives should give particular attention to the reading and discussion of papers and to all of the exhibits.

"It has been our experience," observes Mr. Blakslee, "that members of our organization who have attended the Cincinnati convention each year have returned with ideas that, when put into effect, reduced our costs, made our mines safer for the employees, and aided indirectly the marketing of coal. If a company with an annual output of 1,000,000 tons spends $1,000 in sending men to Cincinnati and, as a result of knowledge gained at the convention, costs are reduced only 1 mill per ton, the expenses have been paid; if 1 cent per ton is saved, the company, of course, reaps big dividends."

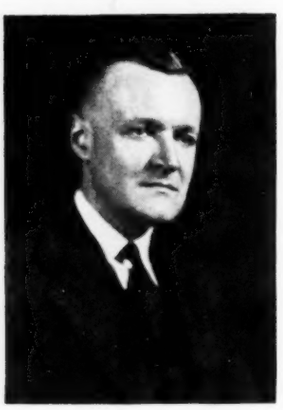
Superintendents, mine managers, and chief electrical and mechanical engineers will get the most out of the meeting, says F. S. Pfahler, vice-president and general manager, Superior Coal Co. Possibly, he adds, a man from the accounting department also should be included in the delegation. These men "ought to study the exhibits of machinery of all kinds that could be used in the modernization of a mine and give particular attention to equipment most adaptable to conditions at their own operations." Technical sessions bearing on problems met in their own work should be covered.

"Mechanization of mines, in my opinion, is in its infancy," declares Mr. Pfahler. "Only the surface has been scratched. The American Mining Congress offers an opportunity for operating men to gather in a few days at a small expense information that would take weeks to acquire in any other way. The manufacturers display the most up-to-date machinery and make it well worth any man's time to spend a few days at this convention if he hopes to keep up with the operating game of mining."

Because the papers presented at the technical sessions are available for later study in printed form, emphasis is placed upon the benefits to be derived from a study of the equipment exhibits by R. P. Maloney, president, Penker Coal Mining Co. He suggests that operating companies should

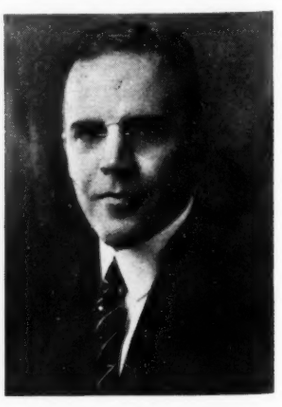
S. W. Blakslee

M. D. Cooper



R. P. Maloney

Newell G. Alford



be represented at the convention by the chief engineer, mine superintendents, foremen, and electrical engineers.

The Consolidation Coal Co., says Thomas G. Fear, general manager of operations, has made a practice of sending division managers, division general superintendents, and maintenance superintendents to the Cincinnati convention. The last-named group "apparently pays more attention to the new machinery exhibited and gets more new ideas than any of the other men. In addition to seeing new machinery, these men also make personal contacts with men of other coal companies in the same line of work, and the exchange of ideas is worth the expense of the trip."

The convention is especially interesting to operating executives above the position of superintendent, "although superintendents might also well be included," states W. L. Affelder, vice-president, Hillman Coal & Coke Co. "The convention also should prove of interest to chief engineers and master mechanics. Considerable benefit would be derived by such officials if they only visited the exhibits. On the other hand, "they would certainly get some valuable information by listening to the papers and discussions."

Cincinnati offers the staff of the average coal mine unrivaled opportunities "to secure, in a few days, a reasonably comprehensive review of machinery and equipment available and of methods in use," writes Dr. L. E. Young, vice-president, Pittsburgh Coal Co. "Nowhere else in the United States is there such an assembly of coal-mining machinery and men versed in its use."

THE convention gives operator, engineer, and manager a place where men in search of information and ideas may meet and compare notes. "The exposition," continues Dr. Young, "is a place for the young men to make contacts and to profit from the experience of the veterans in the industry; a place for the old timers to check up on what new devices are available to reduce operating costs; a place for operating officials striving to solve problems in mechanization to find someone who has dealt successfully with similar difficulties and who will be willing to pass to others the essentials of his experience."

Mechanical loading, Dr. Young points out, is not the only phase of mechanization featured at the con-

Cincinnati Technical Program

Monday, May 5—2 p.m.

Theme: "Outstanding Developments in Coal in 1929-30."
Chairman—Dr. L. E. Young, Vice-President, Pittsburgh Coal Co.
"Mechanized Mining," by G. B. Southward, American Mining Congress.
"Statistics on Mechanized Mining," by F. G. Tryon, U. S. Bureau of Mines.
"Anthracite Developments," by Eli T. Conner, Consulting Engineer.
"Developments in Fuel Utilization," by Howard N. Eavenson, Eavenson, Alford & Hicks.
"Developments in Strip Mining," by K. A. Spencer, Pittsburg & Midway Coal Mining Co.
"Developments in Mining Machinery in the United States and Europe," by W. H. Rastall, U. S. Department of Commerce.

Tuesday, May 6—9 a.m.

Theme: "Mechanized Mining."
Chairman—R. L. Ireland, Jr., General Manager, Bituminous Mines, M. A. Hanna Co.
"Developments in Mechanized Face Preparation in Anthracite."*
"Gathering Methods Developed for Mechanical Loading," by R. J. Oldham, Centralia Coal Co.; discussion† by Charles Gottschalk, Big Vein Coal Co.
"Power at the Loading Machine," by Carl Lee, Peabody Coal Co.
"Keeping Costs and Statistics on Mechanized Mining," by W. L. Affelder, Hillman Coal & Coke Co.

Tuesday, May 6—2 p.m.

Theme: "Transportation and Maintenance."
"Large Locomotives in Long Haulage," by G. G. Kanable, Rochester & Pittsburgh Coal Co.
"Maintenance, Repair and Lubrication."*
"Increasing Capacity of Mine Cars."*
"Locomotive Haulage and Strip Mining," by W. S. Rausch, Lehigh Navigation Coal Co.

Wednesday, May 7—9 a.m.

Theme: "Personnel Training."
Chairman—Milton H. Fies, DeBardelebe. Coal Corporation.
"National Survey on What Is Being Done by Industry in Training Men," by Dr. J. J. Rutledge, Maryland Bureau of Mines.
"Training Men at the Face," by Thomas G. Fear, Consolidation Coal Co.; discussion† by J. W. Bischoff, West Virginia Coal & Coke Co., and J. A. Long, Woodward Iron Co.
"Utilizing the Mine School Graduate."*
"Developing Bosses and Coaching Men in Anthracite."*

Wednesday, May 7—2 p.m.

Theme: "Mechanized Mining in Thin Seams."
"Entry Development With Conveyors," by John Richards, Wheeling & Lake Erie Coal Mining Co.
"Conveyors in Room and Pillar Operations," by George J. Krebs, Reading Iron Co.
"Scraper Mining on Long Faces."*
"Long-Face and Longwall Mining Methods," by Earl H. McAllister, Mining Engineer.

Thursday, May 8—9 a.m.

Theme: "Cleaning Coal."
"Cleaning Coal at the White Oak Coal Co.," by W. E. Tissue, White Oak Coal Co.
"Cleaning Coal at Carswell and Nellis," by Charles W. Connor, American Rolling Mill Co.
"Cleaning Coal at Central Indiana Coal Co.," by William H. Stewart, Central Indiana Coal Co.
"Cleaning Anthracite Coal," by Paul Sterling, Lehigh Valley Coal Co.

Thursday, May 8—2 p.m.

Theme: "Mechanized Mining in High Coal."
Chairman—W. J. Jenkins, President, Consolidated Coal Co. of St. Louis.
"Development and Operation With Mechanical Loaders."*
"Development and Operation With Pit-Car Loaders."*
"Operation with Conveyors," by F. W. Whiteside, Victor-American Fuel Co.
"Stripping in the Tri-State Field."*

Friday, May 9—9 a.m.

Theme: "Accident Prevention."
Chairman—A. J. Musser, Vice-President, Clearfield Bituminous Coal Corporation.
"Methods Employed in Developing, Maintaining and Enforcing Safety Codes."*
"Relation of Mechanical Mining to Safety," by Dr. L. E. Young, Pittsburgh Coal Co.; discussion by J. D. Zook, Illinois Coal Operators' Labor Association; S. W. Blakslee, Pennsylvania Coal & Coke Corporation; E. A. Siemon, Hillman Coal & Coke Co.; Edward Bottomley, Sheridan-Wyoming Coal Co.; F. S. Pfahler, Superior Coal Co.; J. W. Stedelin, Marion County Coal Co.; Thomas G. Fear, Consolidation Coal Co.; E. J. Christy, Wheeling Township Coal Mining Co.; Frank Hillman, Woodward Iron Co.
"Physical Examination in Relation to Accidents," by T. E. Lightfoot, Koppers Co.
"The Safety Award Winners—How They Do It."*
"Rock-Dusting Practice."*

Friday, May 9—2 p.m.

Theme: "One Hundred Per Cent Mechanized Mining."
Chairman—Ira Clemens, President, Commercial Fuel Co.
"A 100 Per Cent Pit-Car Loader Operation in Illinois," by F. S. Pfahler, Superior Coal Co.
"A 100 Per Cent Anthracite Conveyor or Scraper Operation in Anthracite."*
"A 100 Per Cent Mechanical Loading Operation—Wildwood in the Movies."*
"Modern Coal Stripping."*

*Name of speaker not yet announced.
†It is planned to have discussion after every paper; for those subjects showing no discussion in the foregoing, the names of the leaders of the discussion had not been made public at the time this issue of *Coal Age* went to press. The same applies where no chairman is shown for a session.

vention. Preparation is not neglected. "Electrification is not new, but there are many new things in electrification, and these have been presented well from year to year. The training of men and the reduction of personal injuries are two phases of the mechanization problem which are receiving increasing attention at Cincinnati. The human side of mechanization merits the serious consideration of operating officials."

R. V. Clay, assistant general manager, Wheeling & Lake Erie Coal Mining Co., answers the query of *Coal Age* as to what officials should go to Cincinnati by stating that his organization will be represented at the convention next month by the general manager, assistant general manager, chief mechanical and electrical engineer, chief mining engineer, division and mine superintendents, and purchasing agent. Each division superintendent "directs the interests of his several mine superintendents so that they will get out of the Mining Congress what he feels they most need as superintendents of the particular mines where they are located."

Coal company executives, operating officials, engineers, and men in charge of power operation and distribution will find attendance at the convention "well worth while in every way," says M. D. Cooper, division general superintendent, Hillman Coal & Coke Co. "The 1930 convention promises to be fully equal to former conventions in every particular and may exceed them in some ways. It offers opportunities for observation of late models of equipment and for acquaintance among the members of the mining industry that are unexcelled."

Key executives, superintendents or others in actual charge of operation, mining engineers, master mechanics,

F. S. Pfahler

W. L. Affelder

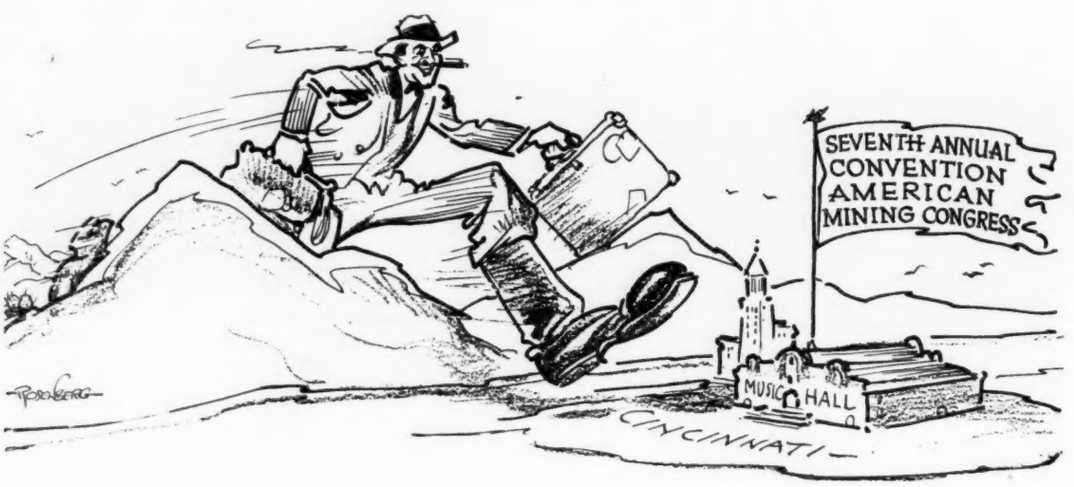
Thomas G. Fear

mechanical engineers, safety engineers, and company mine inspectors should attend the convention, suggests Newell G. Alford, of Eavenson, Alford & Hicks. "Superintendents and engineers should attend the reading and discussion of those papers of vital interest to their own problems or of such papers as present methods that might be adaptable to their own conditions.

"The practical men, as well as engineers, also should cultivate the acquaintance of manufacturing representatives and get all they can from these men. Very frequently the manufacturing and sales engineers have surprisingly good information in other lines not associated with their own. As a rule, nowadays they are well informed about recent developments and are only too willing to assist in any of the many ways that they can.

"For men working off from the large industrial centers these contacts are extremely valuable. The information and broader viewpoint that come from such acquaintanceships are of great inspirational value, especially to the younger men in the industry who frequently flounder around before they discover the key to further advancement in their life work."

A coal man should go to Cincinnati to broaden his views of the industry at large, to increase his acquaintanceship with the mining fraternity, to familiarize himself with modern preparation methods and modern production equipment, says Ira Clemens, president, Commercial Fuel Co. He should attend also to figure out some of the advantages to be gained which might help him in his own particular business and to find out the troubles his brother operators have.



9½ TONS PER MAN

+ Is Clinton's Daily Average In a Continuous Mining Process

By ALPHONSE F. BROSKY

Associate Editor, Coal Age

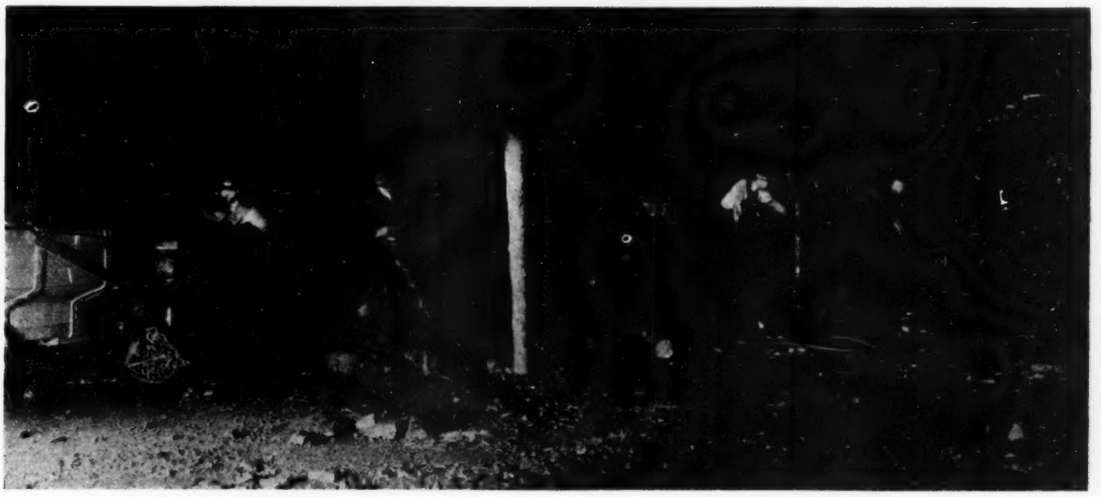
IN 1921 THE average output per worker at bituminous mines in this country, according to the Coal Commission's engineering report, was 4.19 tons, a figure evaluated by counting as workers only those above and below ground who contributed directly to the winning of coal. At that time mechanization as it is now understood was at its beginning. Today, approximately ten years later, the No. 6 mine of the J. K. Dering Coal Co., near Clinton, Ind., operating 100 per cent mechanically in a bed that barely averages 5 ft. in thickness, is producing 1,400 tons daily with a plant personnel of 147 men. The daily production per worker at this plant, embracing all employees on the payroll, is 9.52 tons. These figures bespeak more plainly than words the improvement derivable from mechanized mining processes.

Mining is conducted in wide places during the day shift and in narrow places during the two off shifts in a cycle of operation which may be said to be continuous, in that coal is taken during every hour of the working day. Jeffrey Shortwaloaders are used for mining both wide places and entries, ten units of this type having been in operation five years. Assisting these machines in the driving of narrow places, is a Jeffrey entry driver which was installed three years ago. Continuous operation of these machines in a schedule of multiple shifting has been made possible by the utilization of Cardox, or carbon-dioxide cartridges, in blasting.

The workings of this mine are in the No. 4 seam, which lies at a depth of about 300 ft. A hard fireclay comprises the bottom and the immediate roof is a massive gray slate of sound structure, about 22 ft. thick. Overlying this stratum are various beds of shales and sandstones covered by a surface deposit of alluvial clay, sand, and gravel aggregating 30 ft. in thickness. Roughly, 95 ft. above the No. 4 seam is the horizon of the No. 5 seam. This last bed was extracted prior to the opening of the present mine.

From the main heading, as delineated in Fig. 2, double entries are turned right and left for a distance of 1,100 to 1,300 ft. These double entries are 12 ft. wide on 24-ft. centers and with the rooms turned from each side of them constitute a panel. Rooms are driven so wide as to suggest the nomenclature "long-face" rooms. They are 125 ft. wide and 210 ft. long. Only two in a panel are worked at a time, one from each side of the double entry. Between adjacent rooms is left a 25-ft. rib which is holed through for ventilation and not recovered. The panel

Fig. 1—Every Man Is on His Toes



is inclosed by main and secondary barriers 25 and 50 ft. wide, respectively.

Both with respect to the workings within them and to the boundary lines, the panels are extracted retreating. Full retreating, however, is a feature not absolutely necessary for the success of the system. So long as the places within the panels are worked retreating, the panels themselves may be worked advancing. But there is an advantage to the extraction of the panels in a direction away from the boundaries, for then the mined-out sections and the troubles originating in those areas are left behind.

Each room is developed from two necks by a series of cuts which widen out from one neck toward the other. The first two cuts in the necks are loaded by hand and the remaining two or three are taken by machine, three of these cuts ordinarily constituting a full day's work for one machine.

Coal is loaded directly into mine cars and so, as indicated in Fig. 6. track is laid into the room and parallel to the face, the end being turned outward. Thus at the end of the track is a hook section which holds two or three cars. This additional car storage serves a useful purpose when coal is being loaded out of the left-hand corner of the room. That portion of the track which is parallel to the face will accommodate about ten cars.

Best results are obtained when the long axis of the Shortwaloader is maintained normal to the face, or nearly so, during its travel across the room. Consequently, the length of this machine, which is 36 ft., practically governs the distance between the track and the face. However, as the discharge conveyor generally is kept positioned at an angle, the center line of the track may be reduced from the maximum of 36 ft. to a distance as little as say, 24 ft. from the face. Usually, however, this distance is 32 ft.

Room track is barred forward after each cut. This operation is completed in a few minutes, as the track is easily moved, being constructed of 16-lb. rails on steel ties. The gaps left in the track after it is moved ahead are closed by short filler rails. Shifting of cars has been greatly facilitated by the establishment of passing tracks, each accommodating 12 cars, at intervals of 150 ft. on the panel entries. Track, naturally, is laid in both entries and the passing tracks are completed before room work is started.

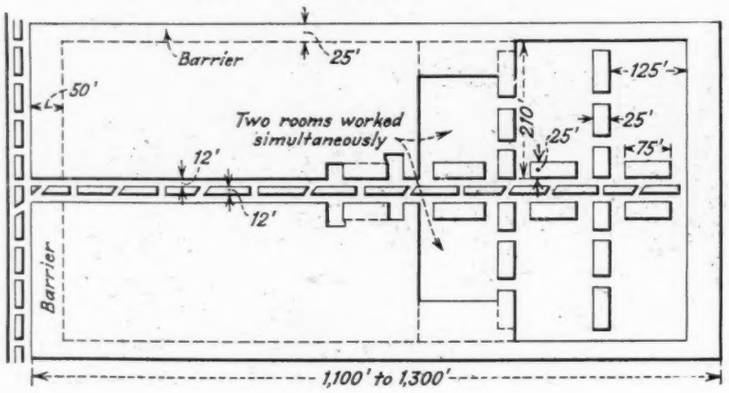
Only in narrow work is the Shortwaloader utilized for both cutting and loading. In wide work the face is cut by a shortwall cutting machine traveling across the place close behind an electric post-mounted drill, which in turn follows immediately after the Shortwaloader. A working unit also includes a gathering locomotive.

As already mentioned, two units are operated simultaneously in a panel. The activities of these two units, or batteries, are supervised by one face foreman who divides his time equally between the two crews. Each unit is manned by a crew of seven workers who perform all the duties incident to putting the coal on the parting. Three men attend the loader, one as a runner, one as an assistant runner, and one as a rear-conveyor attendant. Two men cut and drill, working together only when it becomes necessary to set up and shift their respective machines. One member of the crew serves as a motorman.

While one complete cut across the 125-ft. room face will yield the tonnage generally loaded by a single crew in eight hours, the average crew-shift output being about 140 tons, the layout and schedule of working that allows continuous operation is of prime necessity. Indiana working regulations do not tolerate overtime, and so the daily or shift cleanup system is impracticable. Furthermore, if conditions are encountered such as to preclude the completion of a cut one day, work may be resumed without a curtailment of tonnage on the following day. While the average yield of a face unit is 140 tons, the maximum is about 240

Fig. 3—Loading in a "Long-Face" Room

Fig. 2—General Layout of Panel



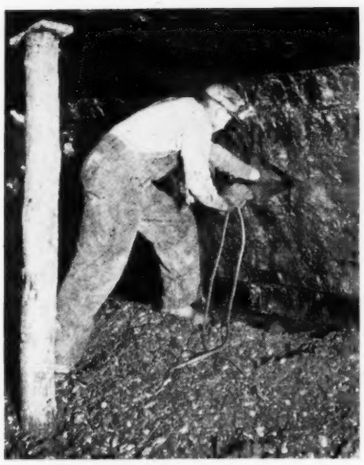


Fig. 4—Without Carbon-Dioxide Blasting, Continuous Mining Would Be Impossible

tons. On some working days, consequently, more than one cut is taken from a place.

Roof conditions are of the best and account for the simplicity of the timbering system followed. At no time has the roof overhanging the faces shown any great weight, though the nearest row of timbers is about 36 ft. from the face. Relatively few safety posts are set; four and sometimes six of them are erected in pairs between the track and the face, sufficient space being maintained between the pairs for the passage of the loader between them. Timbers are 6-in. rounds and are set on 5-ft. centers.

In this system of mining a room is completely mined out in 30 to 40 days. Under the old system followed in the mining of the No. 4 seam, where rooms were driven 24 ft. wide on 35-ft. centers and where no pillars were recovered, three to four years was required for working out a panel. Recovery was relatively low as compared with the present system, which yields about 80 per cent, a high recovery for a Mid-West mine.

All development work is double-shifted, one shift beginning at 3 p.m. and the other at 11 p.m. In this work the Shortwaloaders cut as well as load the coal. A crew in development work consists of three machine men and one motorman. Average progress in a 12-ft. place is $2\frac{1}{2}$ falls, or 15 lin. ft. and 35 tons per shift. The maximum progress made by a development unit was $4\frac{1}{2}$ falls, or 27 lin.ft. of advance in one shift.

Three machine men and one motorman also are used on the entry driver. This machine is operated to cut a 13-ft. entry, advances an average of 28 lin. ft. per shift, and yields about 72 tons of coal.

The use of machines that cut and load or completely mine the coal in entry driving is accepted as matter-of-fact practice at the No. 6 mine. High records of progress in this work have neither been achieved nor sought. While the rate of progress has been moderate, it has been steady and few delays from broken-down, overworked machines have occurred to interrupt the continuity of the double-shift schedule of working.

As in the case of mechanical entry driving, blasting by carbon-dioxide cartridges is accepted as matter-of-fact practice. And this plant holds the distinction of being the first to adopt this process of shooting as a regular practice. Though the operating cost of bringing down the coal is twice as much as by powder, tangible savings and benefits more than compensate for the additional cost. For one thing, this method of shooting yields about 8 per cent more prepared or plus 2-in. sizes. Equally or more important, it keeps the machine in coal throughout each shift. Lastly, its action is gentle and does not disturb the roof.

The Cardox equipment originally installed at this plant continues in use. Cartridges of $3\frac{7}{8}$-in. diameter are charged in 4-in. holes drilled by Chicago Pneumatic drills. These drills are powered by a $7\frac{1}{2}$-hp. motor and complete a hole in about seven minutes. In shooting a room face the holes are drilled 9 to 10 ft. apart and 2 ft. from the roof. The holes are inclined upward so as to terminate about 1 ft. from the roof.

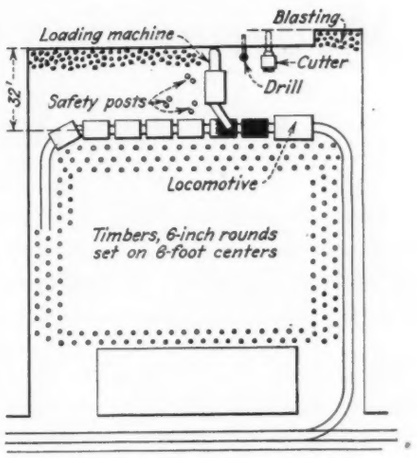


Fig. 6—Schematic Plan of Working

Fig. 5—Eight Per Cent More Lump

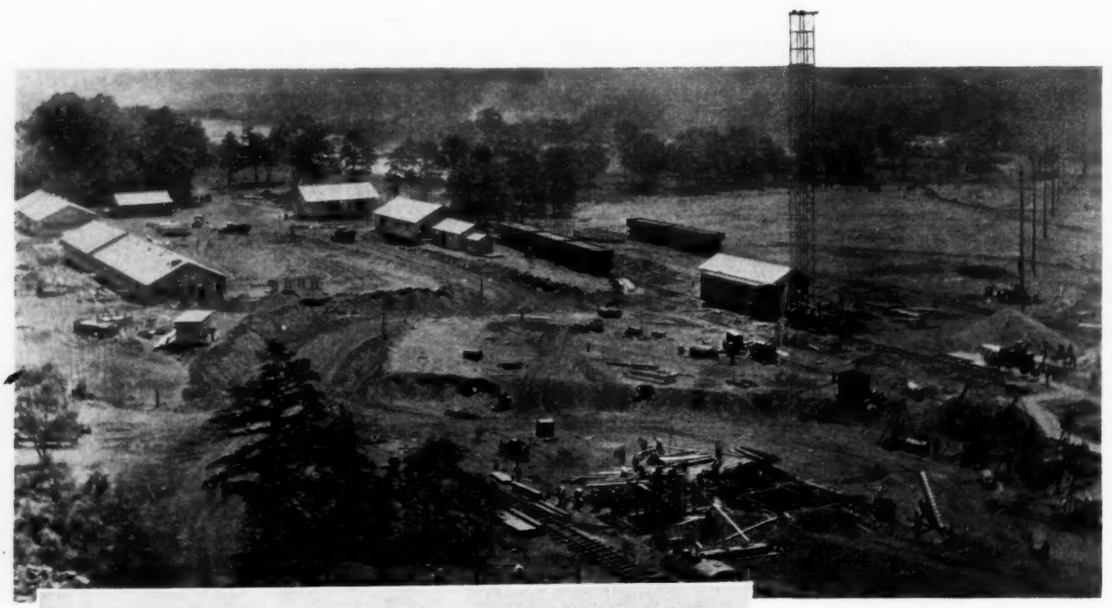
Modernization and the Reading Coal Company

A Picture Story of Progress

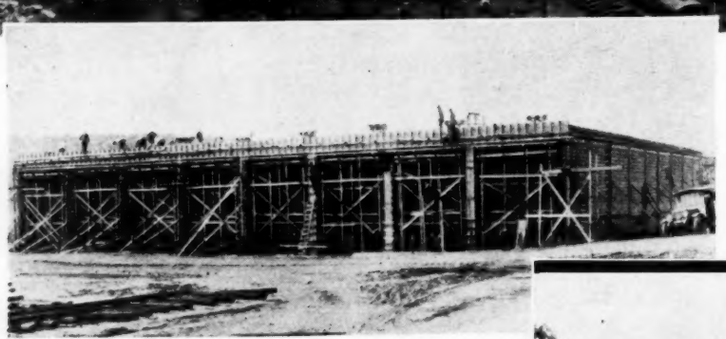
"The wheels started turning today in our Locust Summit breaker," announced A. J. Maloney, president, Philadelphia & Reading Coal & Iron Co., April 2.

This breaker, the first step in the $20,000,000 modernization program launched last spring by this anthracite producer, is one of two central preparation plants planned with an aggregate capacity of 25,000 tons per day. Construction on this unit, which employs the Chance system of cleaning, was started last spring under the direction of the Stone & Webster Engineering Corporation.

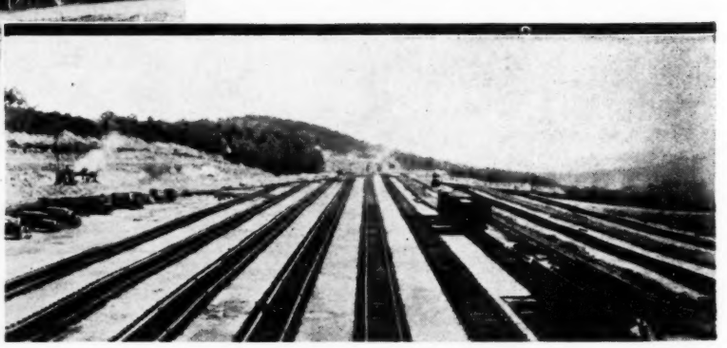
Site of Locust Summit Central Breaker, Looking West; May 6, 1929



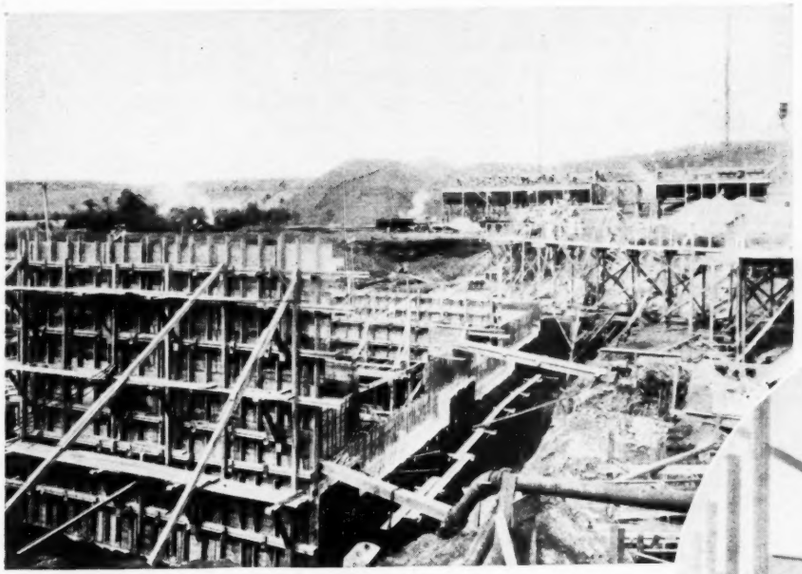
General View of Breaker Site, Looking Southeast; July 2, 1929



Thaw Shed, Looking West; Sept. 17, 1929

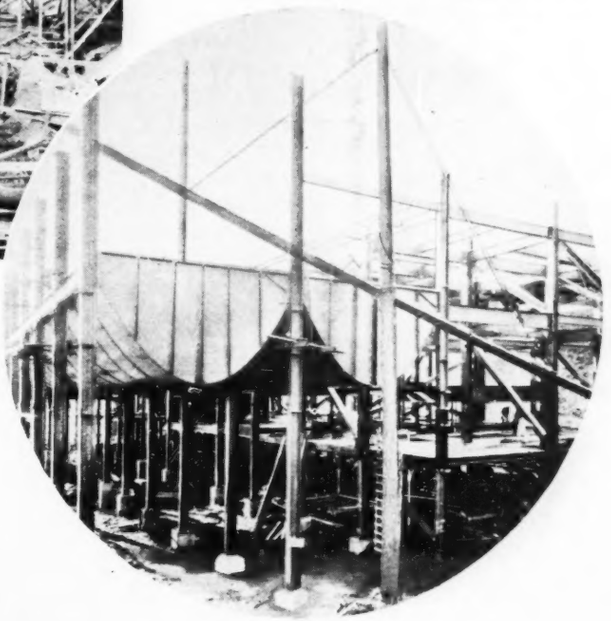


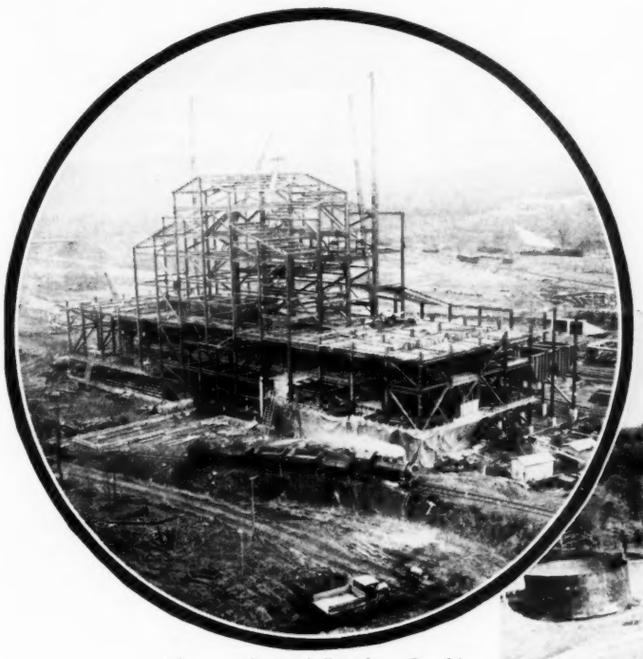
Track Work on Incoming Yard, Taken From Roof of Thaw Shed, Looking East; Sept. 17, 1929



Rotary Dump Hopper and Main Conveyor Tunnel, Looking North; Structural Steel for Central Breaker in Background; Sept. 17, 1929

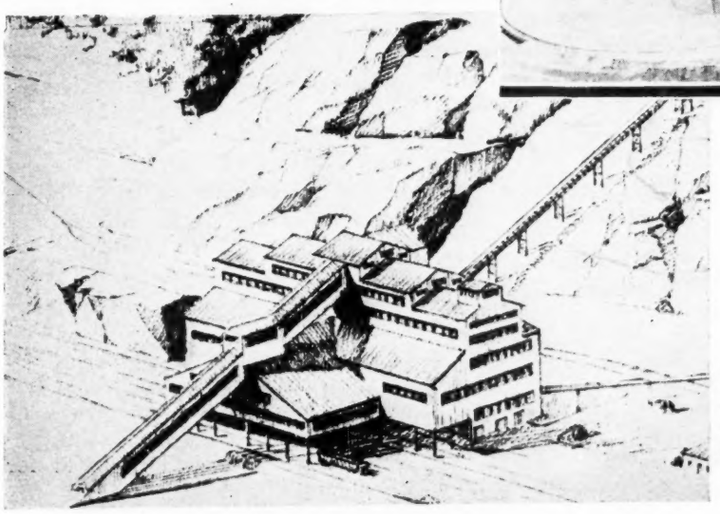
Steel Work for Central Breaker, Looking Northeast; Oct. 4, 1929





Above—Central Breaker, Looking Southeast; Nov. 5, 1929

Dorr Thickener Tank, Mine Water Tank, Suction Water Tank, and Elevated Fresh Water Tank; Looking East; Nov. 5, 1929



Artist's Conception of the Completed Breaker

MAN TRAINING

+For Mechanical Loading At New Orient

By JOHN R. FOSTER

Superintendent, New Orient Mine
Chicago, Wilmington & Franklin Coal Co.
West Frankfort, Ill.

Born in Kentucky, Mr. Foster gained his early mining experience in that state, first with the North East Coal Co., at Paintsville, and later with the Wisconsin Steel Co., at Benham, after graduation from the University of Kentucky. His Illinois career began in 1917, when he engaged in construction work for the C. W. & F. Co. During that year he enlisted in the Marine Corps and served overseas, as an officer, during practically the entire period of the American occupation, receiving the Croix de Guerre and four U. S. citations for valor. On his return home, he resumed his affiliation with the C. W. & F. Co., serving as assistant superintendent at the Herrin mine and as superintendent at the Benton mine until 1928, when he was put in charge of New Orient. This plant then began to undergo the major changes from hand loading to complete mechanization.

WITH MECHANIZATION of underground loading and attendant changes in other phases of the mining operation, management shoulders a much heavier responsibility for the training of men. Success in the application of machines to mine work is largely dependent upon the substitution of speed, skill, and brains in place of muscle straining. Good miners are highly intelligent and need merely that degree of additional training for mechanical mining which is requisite to the handling of any new job in any walk of life. That is to say, man timber available from going hand-loading operations, with proper cultivation, meets adequately the more exacting requirements of mechanical loading.

Under the generally prevailing schedules of payment for mine work in the United States, workers paid a piece rate are in a big majority where loading at the face is accomplished by hand, and the remaining minority are paid by the shift. In the event of delays at plants where hand-loading is the practice, therefore, much of the resultant loss is borne directly by the workers who are paid by the ton. Management's loss through labor is reflected only in the idleness of the shift worker. Responsibility generally cannot be attached directly to either party for these delays. If anything, the fault lies within the system.

The aspect of the situation is different, however, where coal is handled mechanically altogether. Then all workers generally are paid so much per shift regardless of delays, and the losses from interruptions in their entirety are taken by the owner. That being the case, management must assume all responsibility for delays, whether resulting from its own mistakes or from those of workers, individually or in groups. Just as it can prevent the losses incurred within itself by greater skill and judgment, so, by training its employees, management can avert the possibility of losses arising from the working circle.

Another factor which fixes responsibility on the management for the training of the workers is the enormity of the additional sum invested as capital when loading is done mechanically. Overhead is liquid and flows freely through holes shot through the coffer by delays. The coffer can be protected from this onslaught by training men to guard against delays.

Maintenance Naturally Grows More Vital With the Installation of More Machines

So vital a factor in successful operation as man training naturally assumes importance of the first rank at a mine plant the size of Orient No. 2, better known as New Orient, a property of the Chicago, Wilmington & Franklin Coal Co., located in Franklin County, southern Illinois. The program of mechanization of this plant began with the completion of the shafts, in 1922, when loading machines were at once introduced for development work.

Sufficient progress had not been made in mechanical loading in those early days to warrant its application to the exclusion of hand loading. And machines were not then developed to their present degree of perfection. So the tonnage was built up largely by hand loading, though ultimate mechanization of this operation has always been in the forefront. In the ensuing years, as the mechanical loading program unfolded and the tonnage of mechanically loaded coal increased, the tonnage of hand loaded coal was decreased proportionately.

Complete elimination of the drudgery of hand loading into mine cars was accomplished in July, 1929. The mine is now equipped with 29 mobile loading machines, 2 entry drivers and 100 pit-car loaders. The daily output, as in the days of hand loading, when a peak of over 13,000 tons was produced, is set by market requirements. During February, this year, the average daily yield was 10,200 tons.

AS WITH the adoption of machines for loading, the program for the training of men for their operation has been developed gradually, starting from scratch. Like Topsy, the technique "just grew." But out of the experience from this movement, which, of necessity, was not at first as fully organized as now, have come to the organization some well-defined opinions as to how the training should be conducted under conditions similar to its own.

The company is satisfied that, with the possible exception of specialist service for an occasional job, its own man power will meet its needs for trained men—workers and officials. New Orient, being in Illinois, naturally operates with union men. These men are experienced and skilled workers; they are considered loyal and fair in their dealings. Thus can be described the conditions under which, and the man material for which, the training is conducted.

The very meaning of the word *organization* suggests the necessity of building the new personnel from the man material already at hand. Management profits by the selection of local men, because they are accustomed to the organization atmosphere, and know management, men, and conditions intimately. To select men from the existent organization for the new jobs made available by increased mechanization will have an important bearing on the morale of the worker body, by showing that there is an opportunity for good men. This policy will serve as a real incentive for better work and it will stimulate effort toward the mastery of broader knowledge and the attainment of greater proficiency. The fact should be brought out clearly, by both word and action, that promotion is open to those who excel on their jobs. If this plan is followed, the plant personnel will be built up to and maintained at a point where skilled labor is available for all units, with a surplus for expansion. The plan provides the best of foremen as well as workers.

Where a company operates a number of mines, the field from which it chooses organization men to fill job openings should be restricted as closely as possible to the operation about to be mechanized. At the beginning it is all right to draw key men from a mechanized plant and set them to work supervising the installation of new methods at another plant. But it should be made clear that the transfer of these men is temporary; that these supervising forces will be returned to the plant from which they came if and when local men master the new work.

Machine Runners Require "It" and Are Ideal Boss Material

Needless to say, a logical beginning must be made in the training of men, and that start is with the foremen and other underground bosses. It is upon them that the management must largely depend for the dissemination of new knowledge among the workers. The significance of this premise is fully realized only when it is appreciated that worker training cannot be standardized and that therefore it cannot be applied directly to masses; also that workers must be coached individually and that therefore practically all the teaching must be done at the working face. There are a few partial exceptions to this rule and these will be detailed later in this article.

Because more men are at work in the section over which he has supervision, because the intensity of supervision is greater, and because he is charged with the responsibility for an adequate return on a larger capital investment in mechanized loading than in hand loading, the foreman must be more alert and show increasing competence. His knowledge of the mining laws must be on a parity with that which he would need as a boss in a hand-loading operation. In addition, he requires all the other qualities found in a good foreman. But he need not necessarily have experience in operating the machines he directs. He must be sufficiently competent to determine the causes of delays and to eliminate them, alone or with the assistance of superiors or department heads. He should be the type of man in whom can be vested authority for making changes from standardized practices when unusual conditions are encountered. His is a big job.

What should be the origin of foreman candidates is a fair question which cannot easily be answered. Their selection for the post may give them their first job as a boss, for not all good hand-loading foremen are acceptable for the new job. Summed up in a few words, they must have the practical knowledge of men, machines, and methods which is gotten only by going through the mill. These are requisites, regardless of a man's education.

IN THE earlier stages of mechanization at New Orient ten men were selected for special training as bosses, starting as loading machine runners. These men were not unusual in the matter of education or of experience, but they were all practical miners. Their ages ranged from 28 to 38 years. Of these ten men, seven succeeded and three failed. The successful group was comprised of two motormen, two cutters, and three repair men. The group that failed to develop bosses consisted of one cutter, one tracklayer, and one hand loader who had foreman papers and foreman experience before joining the company. These three men made

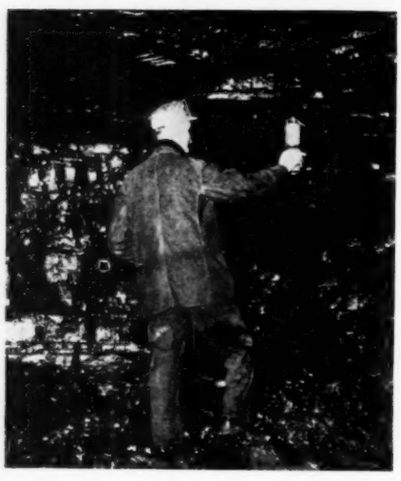
excellent loading-machine operators, but they failed as foremen because of their lack of directive ability.

The fact that three repairmen attained foremanship, while the only tracklayer in the group failed, is no direct reflection on the importance of the jobs formerly held by these men as a greater or lesser asset contributing to the winning of the place. It just so happened that the three repairmen had the desired "it" in their make-up. There are now engaged in mines tracklayers and loaders who can be developed into foremen. The opportunity is equal to all, regardless of job experience.

When a man relinquishes his duties as a worker and for the first time steps into the shoes of a foreman he at once assumes responsibility far greater than that to which he has been accustomed. As a worker, he was charged with the production of his own hands only; as a foreman, he is charged with the production of many hands. Besides, he must account for costs and he is intrusted with the safe keeping of property and men. He may have been a safe man as a worker; he must be impressed with the occasion for being an even safer man as a foreman. To the men over whom he is given control he steps from the ranks and becomes a part of the management. In reality, he is a part of the management.

Of the workers who have failed when given the opportunity to boss, many have fallen down because they have failed to sense the change expected in them by management and men. Men with technical training plus practical experience, if college has not distorted their appraisal of self-value, make unusual bosses because they have the right viewpoint in these respects.

Safety in Machine Loading Is a Job for Tried Men



More than ever before, the industry needs the technical graduate. His use to a coal company when he first enters its employ, however, is not nearly so great as he might think. He is as badly in need of training as the next man, but he should advance much more rapidly if he applies himself. He must go through the mill. Without this training, the college man is of little value, especially if he must fit into a mechanization program. But the industry must let him rise as rapidly as he develops. Otherwise, it may lose him.

It has been said that it is impossible to standardize training. While that is perfectly true, it is possible to classify jobs in accordance with the degree of specialized training required for each. Foremen and loading-machine runners require intensive specialized training. Assistant runners or second men on the loading machines, repair men, and drillers require moderate specialized training. Third men on loading machines (who are stationed at the front end of the machine), timber men, trackmen, cutters, haulage men, and safety men require little specialized training. The specialized training here referred to is that required to fit for new duties in mechanical mining, men who are already well grounded in fundamentals and experience for particular underground jobs.

With the initiation of mechanical loading, usually no trained men are available for manning the machines. The yardstick of job requirements must then be applied circumspectly to the capabilities of likely candidates for the machines. The machine runner is in the lead position and if he cannot lead, the crew behind him will lag. Men aspiring to this job should have some mechanical inclination, but they need not be as familiar with the internal functioning of the machine as is a repairman. That knowledge, though, is desirable, and the runner is given the opportunity to pick it up incident to his primary job.

A popular notion that repair men sense the exact limitations of a machine through their knowledge of its assembly is more myth than truth. A man learns these limitations, beyond which the mechanism is crowded at the expense of increased maintenance in the getting of peak tonnages, only by the feel transmitted to him by practice in handling the controllers and levers. Most important in a runner is his ability to think ahead and thus make every move of the machine count. False moves are costly.

The runner cannot be given supervisory duties beyond those necessary for the control of the machine. He is too busy with his own immediate affairs for that, and should be made to understand that he must confine his orders to the other two men on his machine. Supervision of the remaining members of the crew should fall to a section foreman, one of which should be attached to every two machines.

Men chosen as helpers, or seconds, on a loading machine should meet as closely as possible the specifications for the first-runner job. They are directly in line for this job and must fill it during the absence of the regular runner. The third man needs no particular training for his immediate job, but he must have much the same qualifications as the regular and assistant runners, because he is in line to succeed them. It is necessary that he be a good practical miner. Hand loaders fill this post well, because they possess an abundance of face experience, know how to handle shovel and pick, can test roof, and are competent to determine safety in a place generally. The third man's services are invaluable to safe operation.

Haulage Attendants Require Little Specialized Training

When additional machines are installed, assistant runners should be taken from going machines and given regular runner berths after several days of coaching by a demonstrator or a supervisor. As a rule, it is a mistake to put an experienced runner on a new machine, thus inordinately disrupting an established crew on the machine from which he would be taken.

Haulage men skilled in serving hand-loading operations will be suc-

cessful on mechanized sections. Though haulage systems must be changed with mechanization, these men need no special training. The same holds true of cutters, unless different types of machines are installed and cutting methods are changed. Only those of the cutters who aspire to foremanship will show any desire to leave a cutting machine for a loading machine, a disinclination which is only natural, as the competence for their labor is not thereby increased. First-rate hand loaders know how to place holes for best results from blasting. They therefore make the best drillers with the least training. As already suggested, the broad duties of trackmen, timbermen, and similar semi-skilled labor demand little specialized training for mechanical mining.

Maintenance of underground loading equipment is an entirely new line of mine repair work and therefore demands at least moderate and perhaps intense specialized training, depending on the earlier experience of the candidates for the job. More men are required for this work than formerly were used for the getting of a specific tonnage by hand loading. Experienced men will not be available for every place, which means that training is highly important to maintenance. Repair men are on a level with machine runners in their importance to production. The meeting of immediate needs in maintenance is one of the biggest problems faced in switching from hand to machine loading.

The supervision of safety in mechanized mining is not a young man's job. Safety, relatively, has the same characteristics as in hand loading, except for increased emphasis on a certain few hazards. Experience and age are requisites of the man who would cope best with the hazards. Concentration of workings by mechanized mining does not lighten the safety staff. New Orient employs 30 men in safety work, including the examiners.

Wildwood—and Cincinnati

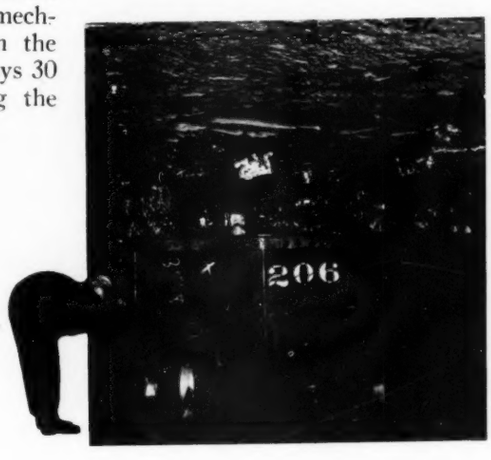
Two special features will dominate the editorial content of the May issue of *Coal Age:* The story of the Wildwood mine of the Butler Consolidated Coal Co. and the report of the Seventh Annual Convention of Practical Coal Operating Officials and National Exposition of Coal-Mining Equipment, held under the auspices of the Manufacturers' Division of the American Mining Congress at Cincinnati, Ohio, May 5-9.

Wildwood, conceived, designed, and constructed for complete mechanization, has captured the interest of engineers and executives at home and abroad—and the reasons for this interest will be told for the first time in the next issue of *Coal Age.* The Cincinnati convention has established itself as one of the high spots of the year—and *Coal Age* will bring its readers this story while it is still dripping with the freshness of news.

Separate departments for such divisions of operation as haulage, machine maintenance, engineering, and power distribution are indispensable at a large mechanized plant. Heads of these departments should, indeed, be specialists, for upon them rests the responsibility not only of planning and executing but of training personnel.

The partial exceptions to the confining of training to the face are in the advanced coaching, or schooling—call it what you will—that is applicable to certain jobs. Foremanship is susceptible to a relatively large degree of out-of-mine training. Maintenance men can be trained almost entirely on the surface, in the shops, or in a school, where they may be given the opportunity of assembling, disassembling, and otherwise repairing machines under expert guidance. To a limited degree, loading-machine runners and drillers can be helped in their respective jobs by assembly into classes.

Section bosses at New Orient meet twice each month immediately after working hours. Safety methods, face preparation, tonnages, and blasting are discussed; development methods, maintenance, inspection, and general operation are outlined; and difficulties met and overcome in certain sections of the mine are detailed for the benefit of all. Cost keeping and cost analysis are stressed. Personalities are left out of these discussions as far as is possible. The superintendent conducts these meetings, with the aid of department heads and other officials.



Loaded Cars at the Bottom? Man Training Puts Them There

CARSWELL MODERNIZATION

+Includes First Rheo Washery In Pocahontas Field

By J. H. EDWARDS

Associate Editor, Coal Age

TOP IMPROVEMENTS recently completed at Carswell mine of the Houston Colleries Co., a Koppers interest in McDowell County, W. Va., have modernized power generation, refuse disposal, and coal preparation. The last step involves an innovation in cleaning Pocahontas coal.

Carswell operation includes two hoisting shafts 150 ft. apart, delivering coal as a mixed product to one tipple. The total production at present is about 2,000 tons per day, but the new equipment is installed for a maximum output of 3,000 tons. One shaft 300 ft. deep serves a mine in the Pocahontas No. 3 seam and another 240 ft. deep serves workings in the Pocahontas No. 4. The No. 3 seam mine produces 1,250 tons and the No. 4 about 750 tons. Prepared sizes go to the commercial market and the ½-in. slack goes to the Koppers byproduct coking plants.

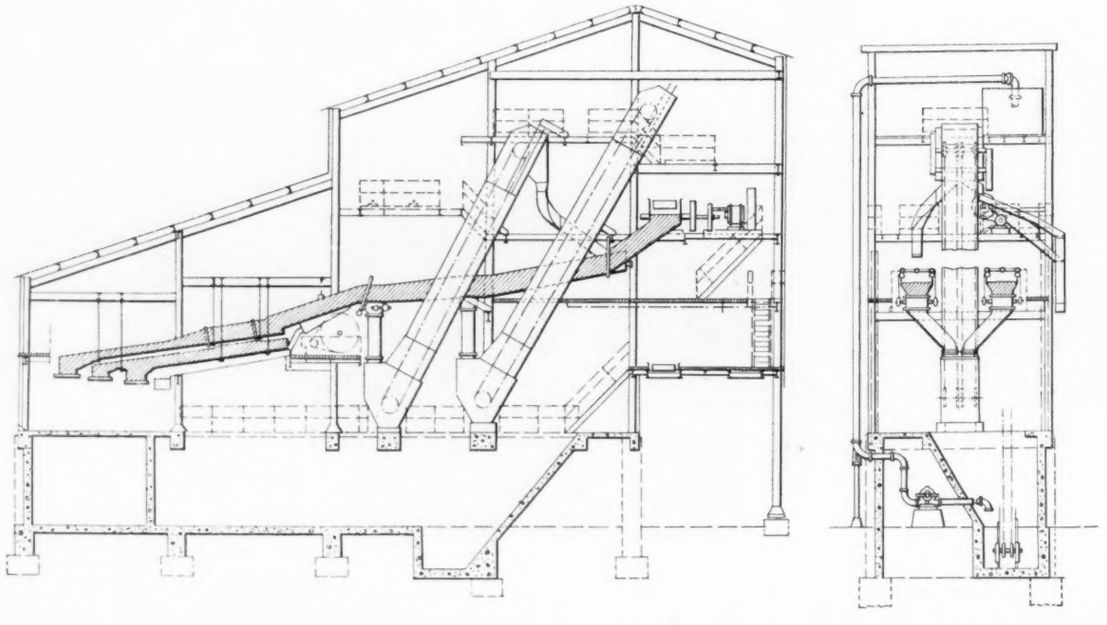
The coals are characteristically friable and the No. 3 contains a bone 3 to 5 in. in thickness to which the coal adheres tightly on both sides. Two thin streaks of bone are encountered in the No. 4 coal. The specific gravity of the bone averages 1.9 and that of the coal 1.35. Pieces, egg to stove size, and consisting of bone and coal adhering together, average about 1.63 in gravity. The mine-run as dumped from the cars contains a maximum of 5 per cent bone and 3 per cent slate.

Before the recent improvements the mine was already equipped with a thoroughly modern tipple with large picking-table areas. Power was being generated in a turbine plant having six 300-hp. B. & W. boilers equipped with dutch ovens and overfeed stokers.

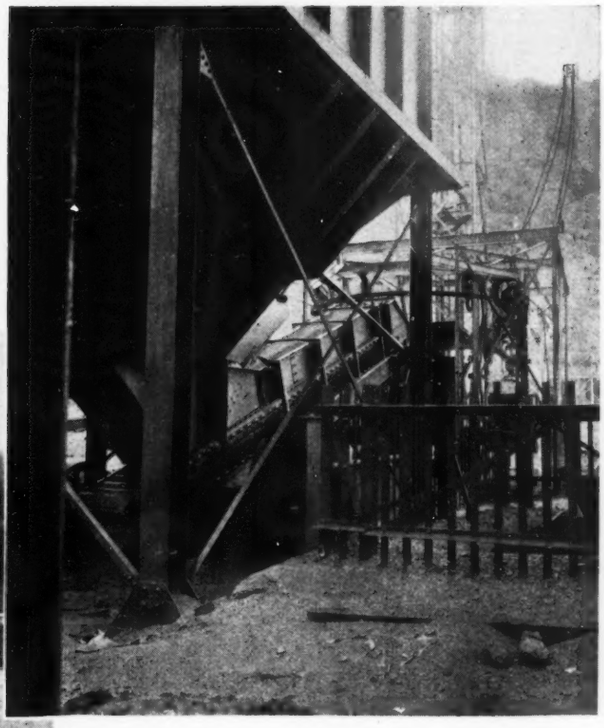
Several reasons figured in the decision to modernize the entire topworks. First, it was impossible to clean the egg, stove, and pea sizes so as to maintain leadership in the market. Second, much coal was wasted with the bone that was removed at the picking tables—the power plant stokers were not of a type which would burn this bone-and-coal successfully. Third, disposal of refuse by hauling to low ground near the tipple was expensive in labor and also undesirable from the standpoint of location and space limitations.

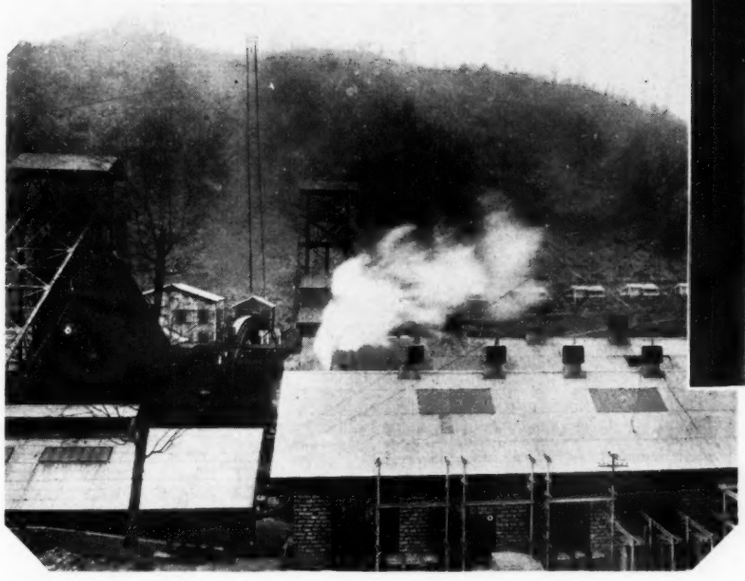
By careful mining, the ½-in. slack was already being held below the minimum ash requirements, so the problem was to clean mechanically the ½- to 5-in. run from the main screens. The friable character of the coal made the avoidance of pre-sizing and feeding through a storage bin desirable. Addition of a cleaning plant would bring about an increase in the quantity of bone-and-coal reject and thus increase the coal waste, unless provision could be made to crush the

Outline Drawing of Washery at Carswell



Bottom of Refuse Bin, Conveyor, Loading Terminal and Tramway

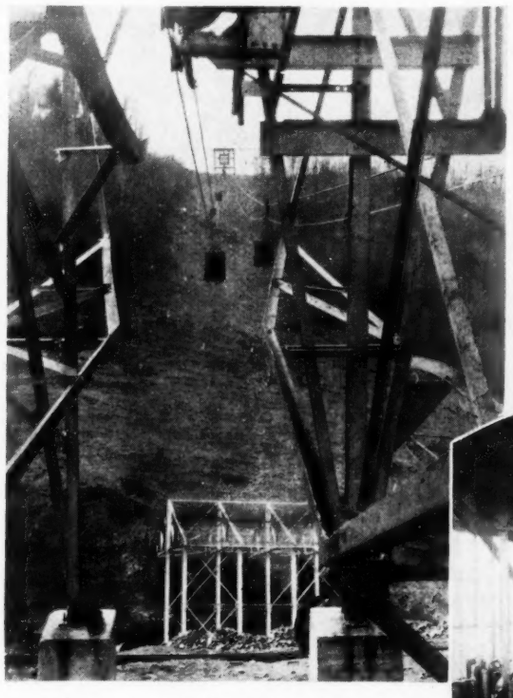


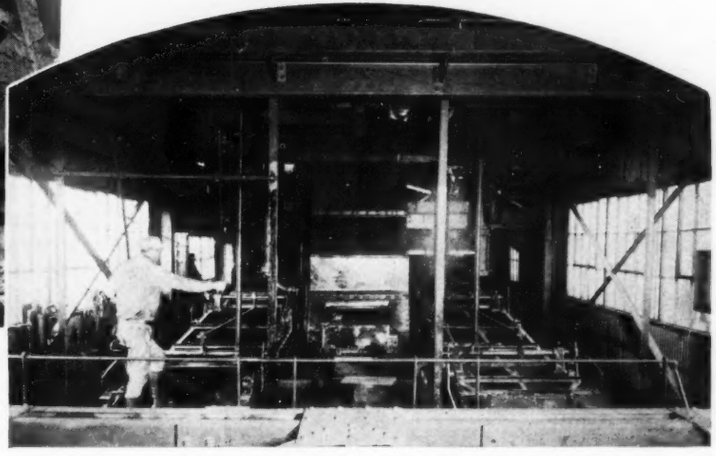


Looking Over Top of the Plant and Toward the Hill Over Which the Refuse Is Taken

The Washer Is Close to No. 4 Shaft. Galvanized Steel Structure at Left Is Aerial Tram Loading Terminal

The Operative's View Up the 32-Deg. Rise to the Knuckle Tower





Right—An Operative Works Water Control Levers at Lower End of Primary Launder. Elevators in Center; Secondary Launder at Right

Pocahontas Washed Coal Leaving the Carswell Plant. White Structures Are the New Buildings; No. 4 Shaft at the Left and No. 3 at the Right.

intermediate-gravity refuse and utilize it as power plant fuel., The plan adopted included a crusher for this purpose, and also installation of underfeed stokers in the boiler plant.

However, as the washing plant treats only the 5x½-in. or 6x½-in. sizes, the quantity of bone and refuse in the washer feed is higher in these sizes than in the mine-car average. So far as the washing plant is concerned, coal is that which floats at approximately 1.50 specific gravity; bone lies between 1.50 and 1.65 specific gravity, and refuse is the sink at 1.65 specific gravity. The quantity and quality of these products varies somewhat between the No. 3 and the No. 4 seams. On an average, the bone represents about 4 per cent and refuse from 8 to 10 per cent of the washer feed.

Washing is by the Rhéolaveur wet process with sealed discharge type of plant, the equipment being designed to handle ½- to 5-in. size, though it is now handling up to 6 in., at the rate of 225 tons per hour. There are two launders or washing troughs, each equipped with two Rhéo boxes. The discharge from the primary launder is a finished coal which passes directly onto dewatering and sizing screens and thence to the egg, stove, and pea loading booms.

Material which sinks through the first Rhéo box of the primary launder is elevated to the secondary or rewash launder, which is installed at the same level and parallel to the primary. Material sinking through the second Rhéo box of the primary is elevated back to the main feed of this same launder. Material from the first box of the secondary goes over a ⅝-in. screen to remove fine coal and then to the refuse, and that from the second box—which material consists principally of bone-and-coal—goes to the roll crusher and thence to the boiler-room bunkers.

This is the first Rhéolaveur installation for washing Pocahontas coals. Because the coal is so easily broken, no storage bin is interposed between the main screen and washer. This means that the coal feed to the washer varies from zero to full conveyor capacity if the hoisting is not continuous at both shafts. And at the present mine production, the washer feed does drop to zero frequently.

Because of this varying coal feed, the flow of water with the coal into the primary launder cannot be left at a fixed value. Instead, the flow is under constant control of an operative who stands on a platform above the lower end of the launder. By levers connected through steel cables to valves at the upper end of the launder, he adjusts the water flow to suit the quantity of coal coming to the washer.

The washed coal is practically free from refuse material—the egg, stove, and pea sizes averaging less than 1 per cent sink at 1.65 specific gravity. This represents a removal of 90 per cent of the refuse material in the feed. Tests on the refuse end show approximately 4 per cent float at 1.65 specific gravity, which represents a bank loss of only 0.3 per cent.

The accumulation of fines and sludge made by the washer is shipped separately without drying instead of being mixed with the raw dry slack.

The new arrangement for refuse disposal consists of a continuous aerial tramway of the Trenton-Bleichert type, designed and manufactured by the American Steel & Wire Co. The loading terminal bin is located in a narrow space between the washer and No. 4 shaft. Rock hoisted through this shaft slides directly into the bin. A belt conveyor serves to bring the rock from No. 3 shaft and also to bring the picking-table refuse from the tipple.

Although the tram is 2,700 ft. long, there is but one tower between the loading and tail terminals. This is a knuckle tower at the top of the first hill. The dumping span of 1,600 ft. is between that and the tail tower, which is on the top of the next hill. An unusual feature of this tramway is the steep grade of the 1,100-ft. span up to the knuckle tower. This is between 31 and 32 deg.

Buckets are of the bottom-discharge type and have a capacity of 30 cu.ft., or 2,550 lb. With a bucket spacing of 510 ft. and a traction rope speed of 500 ft. per minute, the tram capacity is 75 tons per hour. The loaded-side track cable is 1⅝ in. in diameter and that of the empty side is 1 in. Both are of locked-coil construction. Dispatching buckets to maintain uniform spacing is done automatically by an interlocking stop operated by an electro-magnet.

Present improvements to the power house have been confined to the boiler room. The dutch ovens were removed from the boiler settings and the overfeed stokers replaced with Jones underfeed stokers. Steel bunkers were installed over the firing aisle.

THE old coal conveyor from the tipple to the boiler room was raised and extended to serve the new bunkers. Ash removal by steam jet conveyor was abandoned in favor of an elevator and flight conveyor which discharges onto the refuse belt extending from the tipple to the bin at the aerial-tram loading station. This system provides complete mechanical disposal of the ashes.

Additional load has been connected to the plant by building a 3-mile transmission line to Maitland. As soon as a converter substation is installed, the d.c. generating plant at this mine of the company will be shut down. As in the past, the remodeled Carswell power plant will continue to operate in parallel with a turbine plant at the company's Keystone mine, which is 5 miles distant.

Carswell mine now stands out as one of the best equipped operations in the entire Pocahontas field.

DUCKBILL CONVEYORS

+Operate to Advantage

In Drawslate

By R. L. IRELAND, JR.

General Manager, Wheeling & Lake Erie Coal Mining Co.

A ROOF of drawslate has been no deterrent to the application of shaking conveyors equipped with duckbills, in mining the Pittsburgh No. 8 seam in the No. 9 mine of the Wheeling & Lake Erie Coal Mining Co., a subsidiary of the M.A. Hanna Co. This mine is in the eastern Ohio field and is located at Fair Point, Ohio, 9 miles due west of the Ohio River and Wheeling, W. Va. Here, eight conveyor units are in operation, six of them serving in the driving of entries and two in the mining of room coal.

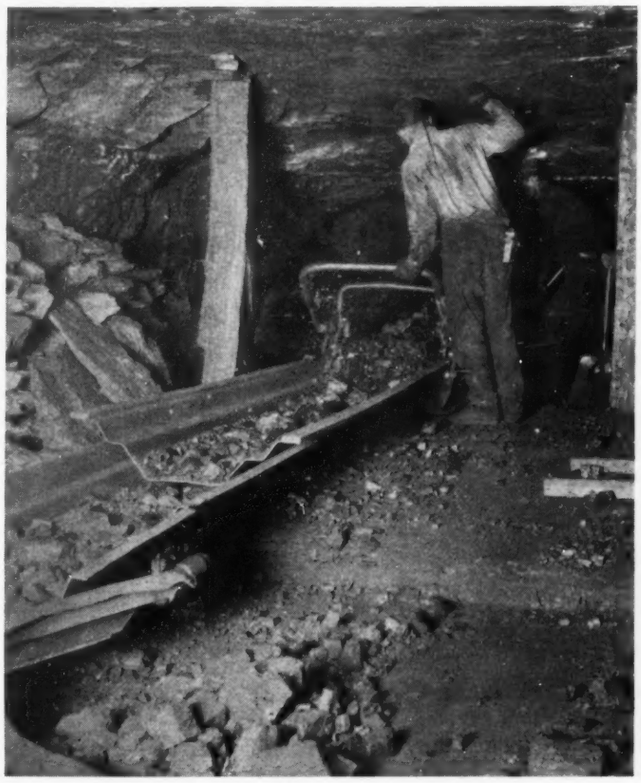
Results obtained from duckbilling in entry driving assure large economies over hand loading, but whether this method will give a comparable degree of betterment in room work has not yet been definitely determined. The experience of the company with conveyors extends over eleven months of operation in entry driving and over only six months in room mining.

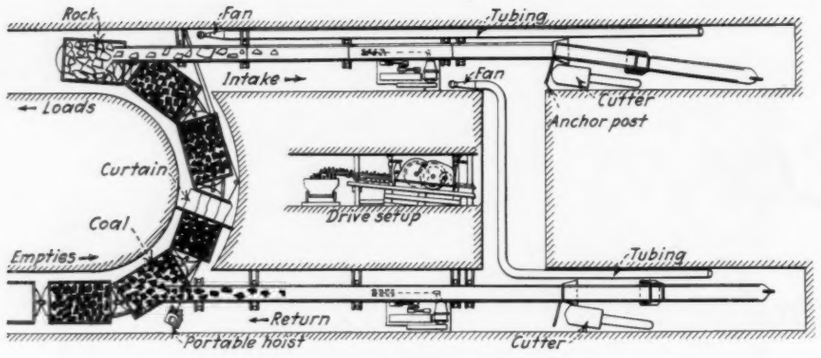
Natural conditions in this mine are representative of the best in the No. 8 seam in this field, but they are by no means ideal. The good conditions encountered in this bed are difficult when compared with those met in the mining of many other seams of equal thickness. Drawslate averaging 12 in. thick lies immediately over the coal, which is 4½ to 5 ft. thick. This slate frequently comes down with the blasted coal; in every case it must be taken concurrently with the advance of the faces, and in entry driving it must be loaded and hauled outside for disposal. Above the drawslate is a rider coal which varies usually from 8 to 12 in. in thickness.

Dependence is placed on this top coal for preserving intact a 6- to 8-ft. bed of soft shale. Where this protective coal gives way, the shale disintegrates and falls, exposing an overlying rock. This last measure is the Pittsburgh limestone, 18 to 30 ft. thick. Locally, the roof coal may thin to shell thickness. Where that is so, the roof is particularly fragile and tender. The nature of this roof, coupled with the occurrence of stray bands of impurities and the bearing-in bands in the middle of the seam, led, incidentally, to the erection of a mechanical cleaning plant in conjunction with the installation of conveyors.

Another condition is the occurrence of rolls in the bottom. Fortunately, this condition is not general. However, where rolls are met, the operation of the duckbill is impaired, for then the end of this loading element does not rest on, but is clear of the bottom. In consequence 50 per cent or more of the coal may have to be loaded by hand shovels into the conveyor. Normally only 5 to 10 per

Duckbill Mining Advances Room Faces Seven Times as Fast as Hand Shoveling





Machine Layout for Entry Driving

cent of the coal need be shoveled by hand. The high and low places in the bottom are not sufficiently pronounced as a rule to greatly disturb the performance of the main body of the conveyor.

At first only one conveyor was tried and the relative success of this unit in entry driving in comparison with hand-loading methods led to the introduction of others. In the original working layout, with but one conveyor in operation, one entry of a pair was advanced 400 to 425 ft. in a single set-up, after which the equipment was transferred to the parallel opening. While this proved to be a considerable improvement over the hand-loading method, time studies showing a labor-cost saving of approximately 30 per cent and a speed of advancement of 13½ lin.ft. per shift, still the operation was not looked upon as entirely satisfactory.

When the driving of a double entry involves hand-shoveling, a miner can be employed in each of the two places simultaneously, and as the depth of the cut taken is 5½ ft., the double entry advances 5½ ft. each shift. With but one conveyor in operation, a 13½ ft. advance in one place in a shift is equivalent to an advance of the double entry of only 6¾ ft., an increase of less than 23 per cent in the speed.

As a result of this experience, the necessity of working two conveyors as a unit in driving a double entry became apparent. This pairing up of two conveyors is the practice now followed. In the accompanying sketch are shown the entry layout, the arrangement of conveyors, and the provisions for haulage and ventilation. Owing to the weakness of the roof, the entries are driven only 8 to 9 ft. wide on 30-ft. centers. Two crosscuts on centers of 45 to 50 ft., as shown in the sketch, are driven at intervals of 325 ft. The outby crosscut of this pair is utilized for trip spotting at the conveyor ends and the inby crosscut serves ventilation. Between them are set the two conveyor drives.

Before being disassembled and moved to a new set-up, each conveyor is extended to a maximum length of 425 ft. Also, the two advance crosscuts which will be used as the base of the next set-up are driven before the conveyors are shifted ahead. The labor involved in moving the two conveyors ahead is 14 man-shifts and during the move two shifts are lost to the coal-getting operation. The cost per ton of moving the units ahead is about 9 per cent of the expenditure for labor on those units.

In the return entry is maintained sufficient empty storage track to accommodate the number of cars needed for the conveyors between visits of a locomotive. As no locomotive is assigned exclusively to the conveyors, the length of this storage track is not fixed. It is so regulated as to synchronize the completion of the loading of a trip with the arrival of a locomotive with a trip of empties. The cars have a capacity of 2 tons. Cars are spotted under both conveyor discharge points by one room-type hoist with a 7½-hp. motor.

Maximum progress in the driving of entries by pan conveyors and Duckbills is made only when the chain pillar is broken through by few crosscuts. This necessity automatically calls for auxiliary ventilation by blower fans and tubing. These units are installed as indicated in the sketch, the presence of the cars together with a curtain in the tracked crosscut serving to direct all the fresh air to the fan intakes. The fans are driven by a ¼-hp. motor and the tubing is of 12-in. diameter.

Attention is called to the manner in which the drives are erected on an inclined cog. This arrangement has been found to be highly satisfactory and has practically eliminated mechanical troubles growing from improper drive set-up. This inclined cog is standardized as to pieces and can easily be adjusted for inclination in line with the pans, and it can be readily leveled. What is more, it has slight tendency to creep and is so uniformly resilient that mechanical punishment to the baseplates is not likely to be inflicted.

Seven of the conveyors are Coscos equipped with a 20-hp. drive of the side-arm type and one is an Eichkoff with a 15-hp. drive, which also is of the side-arm type. The standard pan is 13 ft. long. A few shorter pans are used in making the extensions. The Duckbill section is 19 ft. long and is of the standard swivel type.

One crew of five men divides its time between the two places in driving a double entry. Two men work together in loading, two other men work together in cutting, drilling, shooting, and taking down drawslate, and the fifth man works alone attending to the starting and stopping of the conveyor and to the spotting of cars. Signaling for starting and stopping the conveyors is accomplished by lights at the discharge ends, which are controlled through push-buttons at the faces.

THE loaders and the cutters alternate between the two entry faces. Though an attempt is made to synchronize the cycles so that one group devotes its time to loading while the other group is busy preparing the remaining place for loading, some overlapping may occur. The cutters, for example, may not be through with the cutting, drilling and shooting of coal in one place when the loaders complete the clean-up of coal in their place. In that case, the loaders will set about drilling, shooting, or otherwise bringing down the drawslate and loading it, an operation which normally is handled by the cutters. In turn, the cutters may extend the conveyor for the next cut before leaving a place, if time permits. Each place is provided with a cutting machine and an electric drill. This duplication of equipment lends the flexibility so necessary in an operation of this kind, where duties are divided.

Results achieved by the two-conveyor system are far superior to those which were derived from the operation of a single unit in entry driving. In the present system each place, or the double entry as a unit, is advanced an average of 12½ ft. each shift. The speed of development therefore is 2¼

(Turn to page 233)

PORTABLE SUBSTATIONS

+ Answer Modern Mining Demands

For Rapid-Shifting Load Centers

By F. P. BRIGHTMAN

Industrial Engineering Department, General Electric Co Schenectady, N. Y.

LOCATION of substations for converting high-tension a.c. supply into direct-current for feeders is a major problem in laying out any coal-mine power-distribution system, because, if satisfactory voltage conditions are to be maintained, means must be found to overcome the handicap of a receding load center. This problem is intensified in mechanized mining, because under that system load centers shift more rapidly than under hand mining. To meet this situation the portable substation has been developed.

The majority of motors driving underground equipment are 275 or 550 volt d.c. A d.c. motor will keep on running long after the corresponding a.c. equipment has stalled because of low voltage, but it is operating at a disadvantage under such conditions and the output suffers proportionally. The speed of the average d.c. motor drops approximately 19 per cent for a 20 per cent voltage drop and 40 to 50 per cent for a 50 per cent voltage drop. A voltage drop of 50 per cent sounds ridiculous —but such conditions do exist in remote sections of mines that are spread over a considerable area.

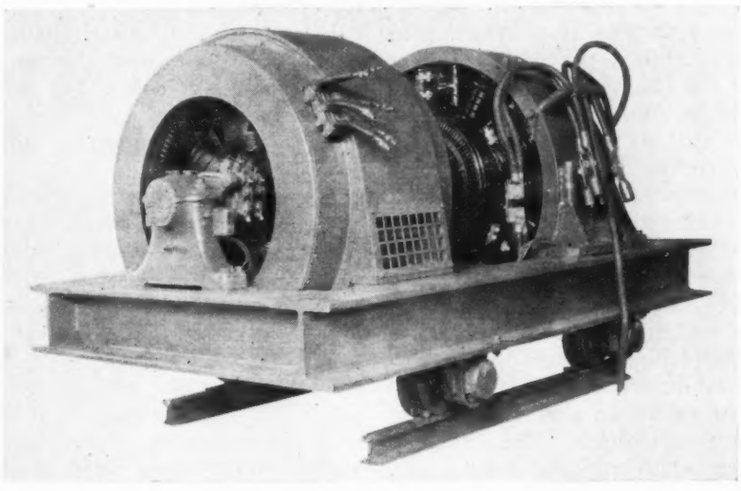
It is always desirable to locate the substations as near to the load center as possible, in order to minimize length of the feeder cables, because, in the first place, the heavy cables required to carry the direct current are expensive, and then, no matter how heavy the cable used, there is bound to be a considerable voltage fluctuation due to the high current swings as the load changes. When a well planned and correctly located substation is first installed the d.c. voltage is good, but inevitably the working face and the load center recedes farther and farther from the substation as the coal is taken out. Gradually the feeders are lengthened until eventually a condition is reached requiring their reinforcing, in order that they may carry the power for the greater distance, or it may mean relocation of the substation nearer the new load center, or a new substation supplementing the original installation if a reasonably good voltage is maintained at the motor terminals.

Extension and reinforcing of the cables is expensive. Moreover, there is a considerable power loss in the cable and return circuit, and this loss increases as the length of the feeder is increased. The kw. loss in the circuit equals amperes x amperes x resistance divided by 1,000.

For example, let us consider a 300-kw. substation supplied with 2,300-volt, 3-phase, 60-cycle a.c. and delivering 275 volts d.c. to a load center approximately 4,000 ft. from the substation. The a.c. incoming line consists of a 3-conductor No. 2 AWG cable, and the d.c. feeder consists of a 1,250,000-c.m. copper cable with rail return.

Theoretically, the rail return should have less resistance than the copper cables, but, in a great many installations, the resistance of the return circuit is equal to or greater than the resistance of the main feeder cable, owing to poor bonding of the rails. But we will asume that the return circuit has the same resistance as the outgoing circuit. The load factor is 50 per cent, so that the average load for a 10-hour period is 150 kw. (545 amp.). The total resistance of feeder

Fig. 1—Portable Motor-Generator Set for Mine Service



and rail circuit is approximately .069 ohm. Under these conditions, the power loss is 205 kw.-hr. which, at 1½c. per kw.-hr., costs $3.07. If the load factor is 75 per cent, and average load 240 kw. (820 amp.), the loss amounts to 450 kw.-hr., or $6.75.

Coupled with this power loss is a voltage drop of 38 at 50 per cent load and 57 volts at 75 per cent load. It is not at all uncommon for loads of 150 per cent to be on for considerable periods and then the voltage drops to 152. If the return circuit happens to have higher resistance than we have assumed it to be, the voltage drop and power loss will be correspondingly greater. Obviously, motors cannot be expected to operate satisfactorily under such conditions.

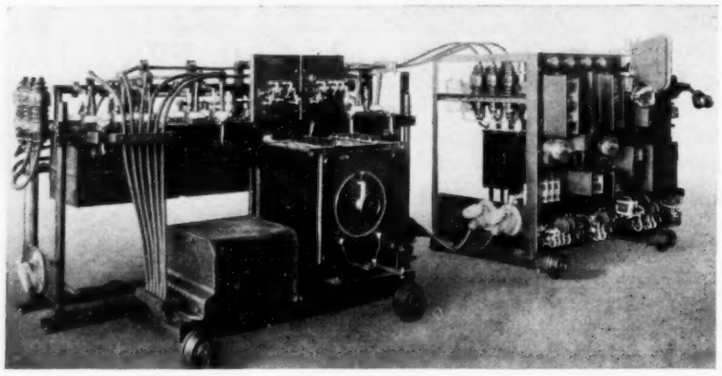


Fig. 2—Control Equipment Set Up for Factory Test; When in Operation, Equipment Will Be Connected in Same Manner as Set Shown at Reader's Left

If the substation could be moved to the new load center, so that the long run was made by the 2,300-volt cable, instead of by the d.c. cable, the power loss in the cable at 75 per cent load on a 300 kw. system feeding a load center 4,000 ft. from the source of power would be approximately 15c. for a 10-hour day. The voltage drop would be approximately 1 per cent, or 23 volts. If the conversion apparatus is a synchronous converter, this 1 per cent will show up in the d.c. voltage as a drop of 2.75 volts, but if a motor-generator set is used the d.c. voltage will not be affected at all.

Unfortunately the job of moving the conventional type of substation entails considerable expense and a prolonged shutdown, with attendant loss of production, unless there is reserve capacity on the system. The portable equipment, however, has all the advantages of the conventional type of substation plus the added advantages of mobility. The equipment is mounted on trucks of suitable gage to fit the mine track, and is designed to obtain minimum height above the rails, in order that it can be taken through entries with a low roof. Portable features can be applied to either synchronous converters or motor-generator sets, together with manual, part automatic, or full automatic control equipment.

An excellent example of portable substation equipment are the two 300-kw. synchronous motor-generator sets with full automatic control which General Electric recently built for use at the Wildwood (Pa.) mine of the Butler Consolidated Coal Co. The Dresser mine of Walter Bledsoe & Co., Terre Haute, Ind., also has recently added a portable substation to its equipment.

Each of the sets in use at the Wildwood mine is of standard 3-bearing construction and consists of a 435-kva., 0.8-pf., 1,200-r.p.m., 2,300-volt, 3-phase, 60-cycle synchronous motor with field coils wound to take excitation current from the generator, direct-connected to a 300-kw. generator rated 250/275 volts, compound wound, good for 50 per cent overload for 2 hours and for 200 per cent for 1 minute. All of the equipment is mounted on 42-in. gage trucks with a wheelbase of 48-in. The over-all height above the rail is 59½-in., permitting of free movement through any of the entries.

The set (Fig. 1) is mounted on an extra heavy electrically welded structural steel base made up of 11-in. I-beams. It is sufficiently rigid to permit of running the machine standing on the wheels, provided the track is level. The track where the set is to stand must be carefully leveled; otherwise, the rotating parts are likely to press against the bearings, resulting in a thrust effect which the bearings are not intended to stand. The base is stiff enough to prevent bending, but it cannot prevent tipping if the track is uneven.

Motor and generator terminals are brought out at the side for convenience in making connections. Extra flexible dynamo cable was used for the 2,300-volt motor leads between the starting-running contactor truck and the machine. In operation these leads are permanently attached at the motor end and equipped with disconnecting type potheads at the other end, so that it is necessary only to pull the plug apart when it is desired to disconnect the motor.

All relays and contactors for controlling the a.c. and d.c. ends of the set are mounted on the right-hand unit, shown in Fig. 2, together with the oil circuit breaker and the d.c. reclosing contactor. The control equipment provides full automatic operation, the same as the conventional type of substation. Stub-multiple d.c. reclosing feeder equipment is built into the generator panel. Each of the two cables connecting the units at the bottom of the trucks is a 9-conductor control cable for the low-voltage control circuits, equipped with standard railway-car type coupling device. This latter device can be inserted into the receptacle in only one position, which assures speedy connection of the control circuits and in the right order.

WHEN it is desired to install the substation in a given location, it is merely necessary to provide a suitable room and a track which has been carefully leveled up. The units can then be hauled in and spotted in the desired location. The primary and secondary cables and the incoming line circuit are connected merely by inserting the plugs. The d.c. connections are the only ones which have to be bolted and, as there are only two cables between the generator and panel to take care of outside of the outgoing feeder, the time required for getting the station in operation should be very short. When it is desired to move the equipment to a new location, it is necessary only to uncouple the connections, hitch on the locomotive, and haul the individual units to the new location. There are no miscellaneous parts to be gathered up and brought along.

A room with adequate provision for protecting the equipment against dripping water and for keeping out unauthorized persons, should be provided for the substation. There also

should be adequate ventilation if satisfactory operation and long life of the set are to be obtained. An excellent means of obtaining the desired ventilation is to locate the substation in a crosscut between two entries carrying air in opposite directions (Fig. 3), so that the fresh incoming air can be drawn into the substation and discharged into the return air current. In this way the ventilating air is cleaner and cooler than if it had circulated around the mine before it got to the set.

A substation located lengthwise in the crosscut as indicated with air flow from end to end of the room gets much better ventilation than a substation located parallel to the entry with air flow across the room. The latter arrangement inevitably causes dead-air pockets. The crosscut arrangement also requires less excavation.

The over-all height of the Wildwood equipment is determined by the size of the motor-generator set itself. While it might be possible to reduce this slightly, the added expense would be so great that it could hardly be justified. The 150- and 200-kw. sizes can be designed for a lower headroom. A tentative layout on a 200-kw. set indicates that it will be possible to build a set for 52-in. above the rails. The switching equipment can be designed to meet any requirements that the set can meet. Induction motor-generator sets can be used as well as synchronous sets, in which case the switching equipment is simplified considerably, especially if the motor is designed for full-voltage starting.

One of the leading coal mining companies is considering the application of the portable features to small units to be used to provide power to drive an individual group of machines consisting of drill, cutting machine, and loader. The proposed equipment consists of a 50-kw. induction motor-generator set designed for full-voltage starting and provided with part automatic control. This type of control provides for manual starting of the set with d.c. reclosing service on the generator end to cut down the loss of time due to power outages caused by overloads and short-circuits.

A number of these equipments, of course, would be required in the mine and the total installed generating capacity would be considerably in excess of that required in a centrally located substation, where advantage could be taken of the fact that all the machines would not be carrying full load at the same time. When the individual units are furnished, they must be large enough to handle the maximum demand of the machines they are driving. Such an arrangement has the distinct advantage that the generator can be located very close to the load and good voltage can be maintained at the motor terminals. The heat generated by the set, of course, is very much less than in the big machine and, consequently, less air is required for ventilation. As a consequence, it is very probable that it will be possible to locate such an equipment on a spur track adjacent to the working face, with some protection provided to prevent water from dripping on the equipment.

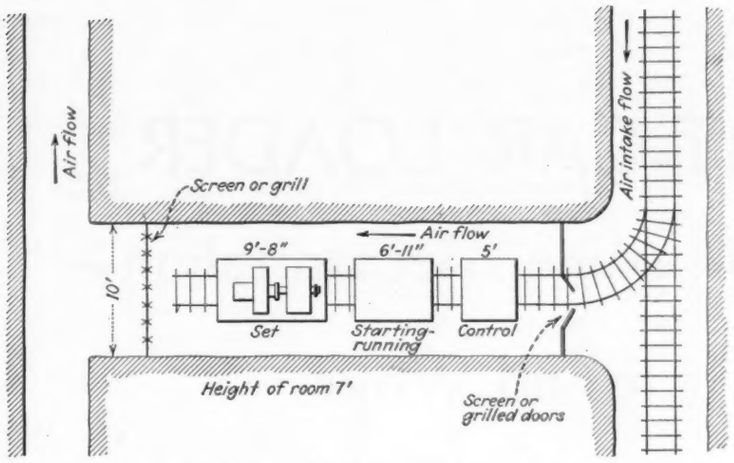
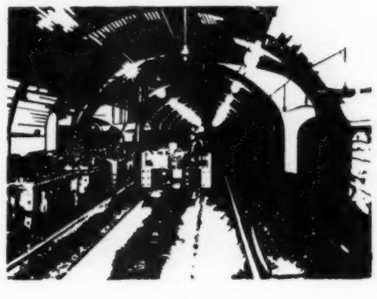


Fig. 3—Suggested Location of Substation to Insure Adequate Ventilation

One of the very important factors entering into the choice of new types of apparatus is the question of price not only on the basis of the bare equipment itself, but also on the basis of a completely installed substation ready for operation. The portable substation equipment here described costs approximately 22 per cent more than the conventional type of equipment ordinarily furnished by the manufacturer. This portable equipment, however, comes to the mine completely assembled and wired, ready to be placed on the track and moved into location. It is only necessary to bring in the incoming cable, and provide the outgoing d.c. feeder cable and negative ground connection. On the other hand, it is estimated that labor and material for installing the conventional type substation, exclusive of foundations and room construction, is approximately 27 per cent of the cost of the set, switching equipment, and the accessories. When the cost for the labor and material is added to the cost of the original equipment, the conventional type of substation installed costs approximately 4 per cent more than the portable equipment, less track and room.



The conventional type of substation is a more or less permanent affair and usually is installed in a reinforced concrete room. The portable equipment is intended only for temporary occupation of a given location and for that reason can be installed in a knock-down type of shelter made of steel framework and corrugated metal or asbestos sheeting, unless the roof structure is so weak that reinforcing is necessary. In either case, substantial foundation floor must be provided.

Where conditions are suitable for inside-of-mine location of the substation, portable equipment provides the operating engineer with a means of furnishing d.c. power to the motor terminals at good voltage with a minimum of power loss in the cables. Good voltage means longer life of the motors, and higher speed and horsepower, with a proportionally increased output of coal. All of these advantages are obtainable for approximately the same price as for the conventional type of substation.

PIT-CAR LOADER

+In Mine Mechanization—

Where and Why?

WHAT of the pit-car loader, better known to some as the portable conveyor? Is it a machine of the type having a definite place today in the mining of coal? What are its major advantages; its disadvantages? To what conditions is it best suited? How does it stack up against the heavier mechanical loading machine? Is the pit-car loader, relatively speaking, a machine the adoption of which is useful merely as a step toward pure mechanical loading, or is it one which fills a want not met by the heavier machine?

These are some of the questions that users of the pit-car loader have been answering for their own satisfaction. They are the questions also which those inexperienced in any form of mechanized loading have been asking their informed brothers. *Coal Age* has just completed a survey of opinions and facts covering the pit-car loader and its operation. This study spreads over seven states and involves 1,088 units with a capacity of 40,203 tons per shift—a weighted production compiled from the figures returned.

The pit-car loader is being used under a wide variety of conditions. Thus far, however, it has been applied most extensively to beds 6 to 7½ ft. thick. Several installations reported, however, are in coal 5 ft. or less thick. The character of the roof has not been a big factor governing the application of this machine, which is being used under sound roof, under weak roof, and under roof which must be taken down.

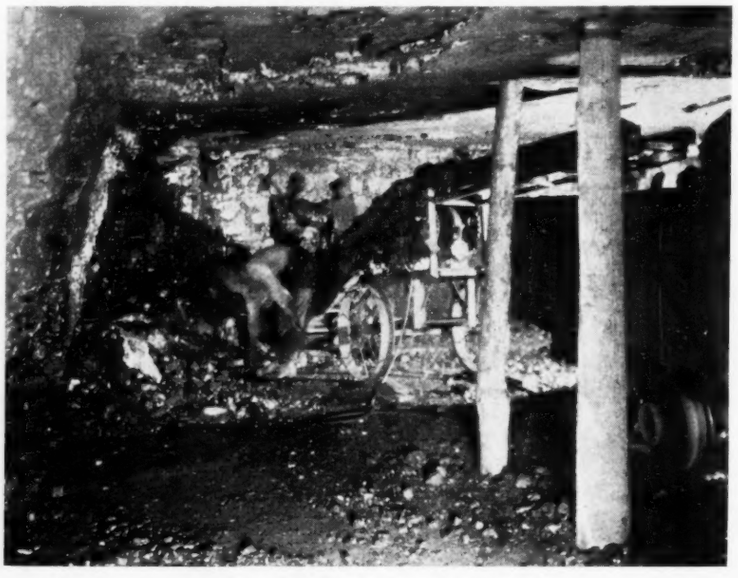
Up until now, the pit-car loader has been used more in the mining of room coal than of pillar coal, but experience has been favorable to the extension of the latter practice. This unit also is giving a good account of itself in entry driving where complementary equipment and the crew are organized for sustained mining. In some instances, the pit-car loader is being utilized merely to clean up scattered and partly worked-out areas; in others, it is being operated in the complete extraction of a section or panel.

Production results are mixed and suggest that best conditions, including thick coal, are not always a criterion of best results. Machine-shift outputs from the thinner seams in some instances are higher than would be expected in comparison with the results generally obtained in thicker coals. The wide divergence between maximum and minimum outputs per machine-shift, for the entire survey group and for certain individual installations, indicates that the unit output which might be reasonably expected is yet far from being reached.

Collective production results, compiled from the accompanying experience table, are as follows: Average production per machine shift, 36.95 tons; average maximum production per machine-shift, 46.17 tons (based on the assumption that all machines produced as well as the best in each of the installations); average output per man-shift on machine, 16 tons; average maximum output per man-shift on machine, 22.69 tons. Incidentally, a study of the table will reveal that the best average output per machine-shift reported (installation No. 17) is 50 tons, with a 2-man crew in a 6-ft. seam. The table shows that, for the most part, this machine has caused no change or a slight decrease in the yield of lump coal. In one case a marked decrease was noted; in another a pronounced increase was established.

Wide variation appears in the depreciation and obsolescence rates charged against this equipment, as the table shows. No two are exactly alike. That grouping of installations having depreciation and obsolescence

Pit-Car Loaders Have a Place



Experience Data and Practice Information on Pit-Car Loaders

Installations	Number of Units	Average Output per Machine-shift, Tons	Maximum Output per Machine-Shift, Tons	Number Men on Machine	Thickness of Seam in Feet	Is Machine Used in Pillars?	Output in Pillars—More or Less?	Lump Increase Over Hand	Depreciation Rate	Obsolescence Rate
1	50	38	43	2	7½	No	....	Less	5c.*	3c.*
2	57	40–60	....	2–3	6½	Yes	Same	None	25%	25%
3	65	39	....	2	7	Yes	.....	Less	†	†
4	222	37	50	2	6	No	.....	None	.....	.....
5	85	30	40	2	6½	No	.....	10%‡ less	33⅓%	.....
6	280	39	45	2	7½	Yes	Less	10% less	1.5c.	.....
7	31	90	....	4	7	No	.....	.....	.....	.....
8	100	36	40	2	6½	Yes	Less	None	4c.	.....
9	7	24½	....	2	4½	No	.....	None	§	§
10	6	40	....	2	7	No	.....	.....	40%	.....
11	10	19.7	25	2	7½	Yes	Same	.....	.....	.....
12	8	15	22	2	5	Yes	Less	.....	.....	.....
13	1	22	30	2	5	No	.....	None	.....	.....
14	175	30.6**	52	2	5	Yes	Less	.....	50%	.....
15	4	39	52.5	2	6	Yes	Less††	.....	15%	.....
16	6	40	65	3	4½	No	.....	.....	20%	20%
17	2	50	....	2	6	....	.....	.....	11%	.....
18	22	28	40	3‡‡	5½	Yes	More	None	3 yr.	.....
19	6	40	75	3	9	No	.....	4% more	10%	.....

* Based on 10,000-ton life. † Written off in 18 months. ‡ 6-in. lump. § Written off by entire saving.
** Average based on results from 8 machines. ††Crew does everything. ‡‡ In pick mining.

rates most nearly alike—representing a sizable fraction of the total number of machines—strikes a combined rate for depreciation and obsolescence equivalent to between 40 and 50 per cent per annum.

"Our property is a new mine, and so pit-car loaders are confined to the advancing of entries and to the driving of rooms," reports one operator. "The vein pitches about 17 per cent and rooms are driven on a strike off panel slopes. After due investigation, we decided it inadvisable to install the more costly loading devices, particularly because we have not had sufficient experience with roof control under the conditions encountered in our new mine. At the same time, we were faced with competition in the market for lump coal which could not be met by hand loading because the miners could not lift the size of lump which, when reduced by uncontrollable degradation in further handling, would meet our market requirements.

"Pit-car loaders have given us a higher percentage of large lump and a general increase in large sizes. But to date I cannot see that these units have in any way affected the cost. I am inclined to believe that the pit-car loader has a definite place in the mining of coal and that, when applied to that place, it will prove beneficial."

"Our main reason for favoring pit-car loaders against what might be called 100 per cent mechanical loaders," states another producer, "is the necessity for maximum elimination of impurities underground. In other words, we are unwilling to face the task of preparation on a scale that is required when the 'take-all' type of machines is used. An immense investment is involved in the installation of the heavier machines, to say nothing of the money required for changing the tipple layout and for putting in additional preparation equipment. As we see it, the pit-car loader offers an opportunity to reduce cost of production, as well as to improve the personnel involved in production, and to lighten to some extent the burdensome task of loading."

In the opinion of still another executive the pit-car loader "has a definite place in coal mining, where (a) the shooting of coal during the working shift is prohibited and (b) the coal seam is sufficiently high and does not pitch too heavily to admit of using the pit-car loader. Our pit-car loaders are being used to handle miscellaneous pillars left behind when we turned over from hand to mechanical loading. As far as I can see, they can be used in the pillars as well as in rooms, conditions being suitable. Broadly speaking, we are now using these machines for 'mopping up' purposes; our men are not disposed to shovel enough coal on the machine to make it economical as a regular practice in our pitching seam.

"The pit-car loader has the advantage of enabling the workman to reject impurities to the same extent as in hand loading. However, picking can be done quite as effectively with any form of shaker conveyor, perhaps even to better advantage when a good floodlight is used at the point where the pickers stand."

"In sections where conditions are unfavorable to the loading machines," is another comment, "the conveyor can be used to advantage, but where conditions favor the use of the loading machine, use of the conveyor is inefficient by comparison. We are using portable conveyors as a major tool in newly developed sections where they work the territory out completely, and we are using them to clean up old workings."

The study disclosed that little or no application of these machines has been made in the Southern and the Far Western states. Few of these machines have been installed in Ohio. Whatever may be the status of pit-car loading elsewhere, the practice continues to go forward in Illinois.

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DUCKBILL CONVEYORS

Operate to Advantage in Drawslate

(Continued from page 228)

times that made by hand-loading, which was 5½ ft. per shift. For obvious reasons, car changing is improved by the two-conveyor system.

As already mentioned, the operation of the two conveyors in rooms is experimental, and whether this practice will be continued depends on the results over a longer period of time. In this work the conveyors are operated singly. The rooms are driven 24 ft. wide and 400 ft. long and a 7-ft. pillar is left between them. No attempt is made to recover pillar coal, because of the difficult roof conditions. The conveyor is installed in the middle of the room, in an avenue 4 ft. wide, between posts which are set on 4-ft. centers on either side of it. At the face, temporary props are set when necessary in the Y-area swept by the Duckbill in fanning from one rib to the other. Drawslate is gobbed by hand between the posts.

Four men comprise a room conveyor crew and the average yield per shift is two cuts, or 60 tons. An equal advance by hand-loading methods would take 3½ days; but as the conveyors are double-shifted, the room faces are advanced at a speed seven times that of hand-loading.

COAL AGE

SYDNEY A. HALE, *Editor*

NEW YORK, APRIL, 1930

Cincinnati-bound

NEXT MONTH, Cincinnati again will be the scene of the annual convention of operating men and exposition of machinery, held under the auspices of the Manufacturers' Division of the American Mining Congress. That these meetings have come to fill a real place in the industry was convincingly demonstrated last winter when a canvass of opinion registered decided disapproval of a proposal to make the convention-exposition a biennial affair. Despite the strides already made in underground loading, improvements in mechanization technique and equipment are still too rapid to safely embalm the story in an encyclopedia.

The program for the 1930 convention, published elsewhere in this issue of *Coal Age*, speaks eloquently of the individual experiences which will be thrown into the pot for the common good at Cincinnati. These experiences later will be made available to all through the medium of the printed word. But the face-to-face exchange of ideas and the visual inspection of the many things progressive manufacturers are doing to further the cause of mechanization will be open only to those who attend in person. And, as one operating executive points out, men who go to Cincinnati come back enthused with practical ideas for lower costs and greater safety in mining.

Growing interest

A RECENT MEETING of the mines and quarries committee of the Pittsburgh Chamber of Commerce initiated a movement to have the coal consumption figures collected for the 1929 Census of Manufactures broken down into counties. This suggestion is in line with an earlier request of the National Coal Association to have the tabulations grouped into "smaller areas" than states. Both proposals are commendable indications of an awakening interest in basic distribution data. As the coal industry plunges deeper into the study of sales problems, the need for more complete and current figures on movement than are now available will become more apparent. Demands for additional data which today seem revolutionary will become commonplace as the industry builds up a statistical background that will really offer source material for intelligent sales analysis. Today we are stumbling in the shadowland.

Spoil reclamation

FARMERS in Midwestern areas adjacent to strip pits view the unsightly spoil banks with such disfavor that legislative aid has been sought to compel shovel operators to restore the stripped land to some semblance of its original appearance. That there is some validity in this complaint is tacitly conceded by the coal industry when it tries to reclaim the waste land by planting timber, fruit trees and other forms of vegetation.

Reclamation of these areas, however, involves problems which still want a completely satisfactory solution. If fruit trees are to be planted or if the waste land is to be reclaimed for recreation grounds and parks, there must be some leveling of the spoil banks. Mechanical leveling is expensive, and the high cost may halt restoration and beautification.

But is this the only method of reclamation? Might not hydraulic flushing, with its lower cost, work? Many of the pits are close to streams which could supply the necessary volume of water; little equipment and few men are required for the job. Mud-pollution of the streams might be advanced as an objection, but this riling of the crystal waters would be only temporary. Water was used to strip a glacial deposit from coal in the Danville district. It has been employed in the disposal of waste material in a small brown-coal pit in Germany. Why not employ the same fluid medium in reclamation?

Whence the sulphur in coal

SOME YEARS BACK, everyone was of the opinion that the pyrite in coal was brought in from outside by water solutions. Later, it was urged that vegetation contained so much sulphur that there was no need to assume that any of it was extrinsic; all that was necessary was to accept the idea that the sulphur had remained constant in quantity when the vegetation rid itself in part of its natural, colloidal, and reaction water; its carbon dioxide, methane, and ash; thus concentrating the sulphur.

From this conclusion it was but a step to assert that all sulphur not only could be intrinsic but was actually so. But one is not obliged to believe everything to be true that one may conceivably believe to be possible. To prove that plants might take up and retain enough to account for all the sulphur in coal does not justify us in believing that it actually was taken up and retained.

There are inherent difficulties in believing that the difference in sulphur content is due to variations in types of vegetation. For instance, the lower Kittanning bed in one section of Pennsylvania may be the low-sulphur bed in the group, and the lower Freeport may be the high-sulphur bed. In another section the conditions may be entirely reversed. Are we to believe that this difference

was due to the presence at any one time in an area now known as Pennsylvania of two totally different floras, one that had a far greater penchant for sulphur than the other; that is, a greater power of assimilating when presented or a decreased power of sulphur elimination.

Probably not. Far more likely is it that the plants were, as far as appetite for sulphur or its digestibility was concerned, all much the same. What varied was the quantity of sulphur in the soil and its propinquity to the surface. However, it may be that some of the sulphur did not enter till after the peat bog had been laid down and come from above rather than from below, and this supposition is as likely as, or more likely than, the other. With evidences of marine life visible in carboniferous beds throughout central Pennsylvania, it is natural to assume that sulphate of lime was more abundant then than now, and the plants often had plenty on which to feed, and the bogs often large quantities on which to react.

We reap what we sow

CERTAIN FACTS in the history of British science are suggestive of the future of the United States. For years in Great Britain, to quote H. G. Wells: "The only knowledge recognized was an uncritical textual knowledge of a selection of Greek and Latin classics." With so many of the leaders of the state and of industry believing that science was beneath their study, that "it was not difficult for the Germans to organize a body of investigators, small indeed in relation to the possibilities of the case but large in proportion to the little band of British inventors and experimentists." Everyone knows what happened: Germany took the lead in science from Great Britain.

In the United States, today, the inventor, discoverer, and scientist find meager recognition. They rarely get rich. All the big rewards which do not go to financier, industrialist, lawyer, and entrepreneur, fall to those who cater to the public pleasure—pugilist, ball player, radio artist, actor, and night-club owner. What can be hoped of a civilization that rewards most generously only those who capitalize the intelligence of others or who cater to pleasure! The first class of individuals is essential for the conduct of the world's business. The second also serves a useful purpose, but so long as the large honors and emoluments continue to pour into the laps of these two classes exclusively, it is not to be expected that enough men will be found desirous of entering the third class.

This third class will be peopled solely by those whose enthusiasms run definitely in that direction, who will be scientific men willy-nilly, regardless of the profitableness or unprofitableness of a scientific career, whether it promises distinction or obscurity, and they will have to labor so industriously that there will be little time for study and research. But it will be a small band indeed and one that will be always under the cloud of discouragement. If the nation would develop in scientific lines, it must recognize science in the press and in a social way, and it must reward talent when it exhibits itself.

The complaints of the technical men of lack of recognition and inadequate pay are not likely to receive much consideration. If the classes that employed them cared for them, they would pay them more. The pity is that those who do employ them find themselves so little interested in science and its possibilities that they are ready to pay others more. They look on life through distorted glasses. Their views cannot fail to discourage science and delay national progress, and that is infinitely more important than the woes and wails of the neglected scientist.

Neither dead nor sleeping

PLANTING flowers on the grave of the Sherman act is more or less a popular pastime with unquenchably optimistic business men. Merger on merger goes unchallenged, allied groups exchange proper and harmless information without rebuke and even with quasi-government sanction—and the less cautious become imbued with the idea that all brakes are off. Then comes warning, followed by action, from Washington and the fond optimists are jolted out of their dreams.

This cycle is now in the process of repetition. As *The Business Week* recently pointed out, some commercial organizations "seem to think that because President Hoover has encouraged sensible co-ordination and co-operation through trade associations, because they have drawn up codes of practice, often under governmental blessing, they are thereby free to regulate production and fix prices." To this Washington replies in no uncertain terms that such illegal practices must be stopped.

Attorney-General Mitchell gave the first warning as long ago as last October when he told the American Bar Association that, until Congress saw fit to change its policy on anti-trust legislation, the Department of Justice would enforce the existing statutes "without prejudice and with fairness, but with firmness." His assistant, John Lord O'Brian, added further emphasis when discussing departmental appropriations before a Congressional committee by the statement that the work of the anti-trust division of the department would be materially increased because some trade associations had overstepped the bounds. The chief abuse against which the division is fighting, he said, "is price-fixing."

The Sherman act may be economically outmoded; many business men are convinced that it is. But the law is still on the statute books and, while it remains there, clear-thinking industrialists will be guided in their actions not by their preferences but by the inescapable facts. To do otherwise is to invite legal chastisement.

NOTES

. . . from Across the Sea

IT COMES almost as a surprise to most of us that the great Ruhr district of Germany has developed the use of the hammer pick to such extent that 84 per cent of the coal is now being obtained by its aid, without the use of any other cutting tool and without the use of explosives. Another 6 per cent is obtained by coal cutters with or without the aid of hammer picks, and the other 10 per cent is obtained by hand and shotfiring.

This statement recalls the fact that when mechanical aids were first used in America for bringing down coal they were all percussive air-driven picks. Heavy affairs they were, riding on wheels resting on an inclined board and guided by both hand and foot and limited to undercutting only. The German hammer pick also is pneumatic and percussive, but it is light and it attacks the coal from the floor to the roof, or from the horizontal cut up to the roof, or down to the floor, or in both directions.

K. Feustel, an engineer of Gelsenkirchen, contributes to *Der Bohrhammer* of January, an article in which he says that the application of the hammer pick on a regular scale to German mining dates back only to 1913, though in France and Belgium it had attained practical significance in 1906 after the terrible colliery disaster at Courrières, in France, which led to a prohibition of shotfiring in coal mines.

In 1913 only 230 hammer picks were in use in the Ruhr. The number reached 80,000 in 1928. Since then the tool has had a number of technical modifications, and the technique of use has been developed. Here it should be added that some coal in Germany is *cut* by mounted picks or by these means and pneumatic picks combined. A distinction should be made, of course, between cutting—that is, kerfing and snubbing—and actually mining the coal.

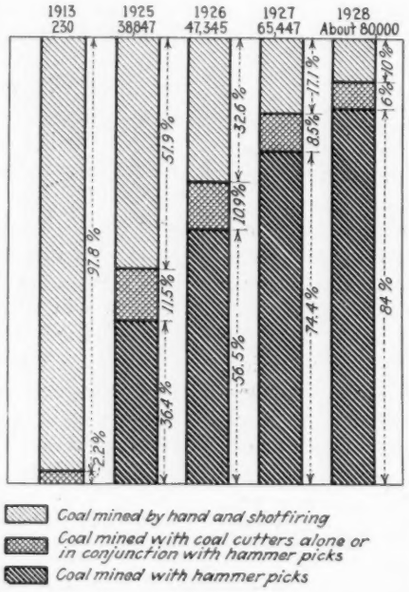
The divergence of the Ruhr practice from our own is hardly more startling than that which Scotland, England, and Wales have made in the matter of conveyors. Conveyor mining originated in America with C. R. Claghorn, who built a face conveyor on a wooden frame in the early part of 1901, which was used at Vintondale, Pa., on a longwall face. The results were so favorable that a permanent installation was made and plans were sent to Col. W. Cuthbert Blackett, a well-known British engineer, Mr. Claghorn having agreed to share ideas and profits with him.

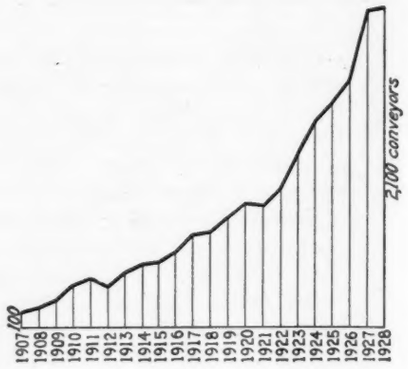
Mr. Blackett made changes on the plans, and the first description of the work of these conveyors in British mines was made before the Institution of Mining Engineers in a paper by the Colonel and R. G. Ware, who had assisted Mr. Claghorn at Vintondale. This paper was read in June, 1905. By 1907, as a graph accompanying these remarks shows, Great Britain had 100 conveyors working.

Many have been the changes since that time, and many patents have been issued. The shaking conveyor was developed in Germany, and it has made much progress in Great Britain. In 1928, about 26 years after the original introduction of conveyors, Great Britain had 2,100 of all kinds at work. In 1927, almost 42 per cent of the Ruhr coal was transported by *shaker* conveyors to the mine car, to say nothing of the backfilling rock which was handled by such machinery.

Because of defects in the early design of conveyors, their road to acceptance in Great Britain was an uphill one, according to a book entitled "Underground Conveying and Loading of Coal by Mechanical Means," prepared by a special committee appointed by the Midland Institute of Mining Engineers, the South Yorkshire Coal Trade Association, and the West Yorkshire Coalowners' Association. These technical and trade groups at their own expense have taken up this study through a "correlator," as he is termed, G. K. Talbot. Twenty-five collieries have been visited, 13 in Yorkshire and 12 in other districts, including Scotland, Durham, Lancashire, Staffordshire, Nottinghamshire, and South Wales. The survey is strikingly like that initiated by the American Mining Congress, though it does not cover as many mines. It is a tribute to the progressiveness of the Yorkshire colliery owners.

In Ruhr, Hammer Picks Dig From Solid Ten Out of Every Twelve Tons





Great Britain's Mines Became Conveyor-Conscious

Sir Robert Horne, speaking in the House of Commons, Feb. 20, of this year, against the government coal bill which calls for mining mergers and urging in his speech that large units do not necessarily result in early introduction of mechanical aids in mining, called attention to Yorkshire, "which has the largest units in the country," and to Scotland, "where there are a great many small units." He placed emphasis on the fact that while Scotland, with thin seams running from 22 to 26 in. and with undulating coal beds, was mining 59 per cent of its coal by machinery; Yorkshire, with thick beds and more regular coal, was mining only 32 per cent—"a figure," said he, "that does not apply even to the whole of Yorkshire, but only to the best part of it."

Yorkshire has evidently been stung by the oft-repeated criticism that it has been easily relying on its thick coal and favorable conditions and has not made any effort to mechanize, and that the Scottish mines, threatened with extinction by the cost of bottom lifting and top brushing, have accomplished a high degree of mechanization. It is interesting to note, therefore, that Yorkshire is going ahead and has 244 conveyors, though Scotland has 463. South Wales, be it noted, has 581.

The British publication to which reference is made refers to the mines by letter, an anonymity that duplicates that practiced by the American Mining Congress. Apart from that, the old days of secrecy are ended in Great Britain. The facts are now available for everyone. Today, ideas are freely exchanged. The old furtive days of the beginning of the last century, when the only way of gaining experience was by disguising oneself and hiring out as a miner in an up-to-date mine, have gone forever, and the world is made better by the exchange of ideas.

The British correlator who has prepared this book has not been content merely to prepare descriptions of mines but has done also a real correlating job, as the titles of his chapters show. At the end of the book, however, he gives descriptions of the methods of mining at various collieries, and here he mentions

in broad terms the district where the mine is located, as Yorkshire, Midlands, Scotland, etc.

Thumbing over the pages, one sees narrow places driven 420 ft. without a single crosscut, but most of the layouts are for longwall. Some day in the United States we shall be allowed by our legislators to drive headings and rooms without crosscuts for a longer distance than the present law allows. Better ventilation requires that pillars be made with fewer openings, especially now that means are available for the adequate ventilation of the narrow places while they are being driven.

The committee finds that "although conveyors tend to bring about a reduction in the more serious accidents, it is probable that there is no reduction in the number of minor accidents, such as the pinching of fingers when the conveyor is coupled, smashed hands at the loading end, etc." It must be noted that the figures given are based not on accidents per thousand men employed but per million tons mined.

When in 1909 I called attention to the probability that roof broke over the coal pillar, arousing thereby much spirited opposition, which even today has not entirely died down, I and those who disagreed with me little realized how long this idea had found lodgment in British literature. *Colliery Engineering*, of London, has dug out of the *Transactions* of the Manchester Geological Survey an article by Joseph Goodwin, dated May 31, 1864. He records a case where two consulting engineers were called on to suggest means to protect from injury a fine residence, and these worthies recommended that a pillar be left under the entire residence and for about 60 ft. on all sides. The mine was 540 ft. below the building and had an angle of inclination of 28 deg. As a result the building was rendered uninhabitable.

"In many cases," says Mr. Goodwin, "the breakage line is so well defined that it is very easy to trace it along the surface for hundreds of yards. I have occasionally seen the surface rent asunder to the extent of 6 or 8 in., and the subsiding portion lowered 16 or 17 in. along the line of the rent." He adds that in eighteen cases that had recently come under his notice the cross-breakage line had extended over the solid coal at an angle of 5 to 7 deg. from a vertical line. Then note this further statement: "If the coal is worked upon the principle of pillar-and-stall, the breakage line will extend over the solid coal as in the case of working by the longwall system."

Mr. Goodwin also gives a table of experiences in breakage which shows that he had been making observations for some time.

Angle of Slope of Seam, Deg.	Depth of Seam From Surface, Ft.	Divergence of Break Line From Vertical Ft.	Angle of Hypothenuse or Break Line Deg.
10	720	216	96½
15	588	204	93½
20	648	228	89½
24	720	258	85½
27	528	210	84½
31	612	273	83
34	750	312	78½
40	594	288	75½

R Dawson Hall

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On the ENGINEER'S BOOK SHELF

Methods of Compiling Statistics of Coal Mining Accidents — International Labor Office (League of Nations). World Peace Foundation, 40 Mount Vernon St., Boston, Mass.; 90 pp., 6¼x9½ in. Price, 50c.; paper.

Difficulties in making comparisons of accident rates have given the U. S. Bureau of Mines no little trouble. Imagine then the perplexities of the International Labor Office of the League of Nations, which has to correlate the statistics of several totally independent countries. These variations are described in the book under review. Even the meanings of the words "accident" and "injury" have to be elucidated, the first referring to the cause and the second to the result—the effect on an individual. Thus there may be a derailment or an explosion which may result in one or many people being injured, or, as it is expressed in America, one or many injuries or fatalities. Each person injured, though he may have many injuries, is termed an injury.

As in America the word "accident" in England is used with some vagueness. A man may "have an accident" meaning an injury, fatal or non-fatal. In order to make clear what is meant the expression "separate accident" is used for the accident itself. If two men are in a car and both are killed or injured, the misfortune is termed as indicated. In Belgium and France there are *accidents* and cases of injury known as *blessés* (wounded) *tués* (killed), or generally *victimes* which word needs no explanation. So in Germany there is *ungluecksfall* (an accident) and *unfall* (an injury). Finally, the report decides on "accident" and "casualty" as describing respectively cause and effect.

One cannot follow along with all the variations, but a table will show some national differences in regard to fatal accidents.

Definition of a Fatal Casualty

Great Britain
Leads to death up to date of annual report but not fatal if death occurs later than a year and a day after the accident.

Germany and Holland
Leads to death before completion of annual report.

France
Somewhat vague. Death must occur immediately after accident or, at most, some months later.

United States
Leads to death before state mine inspector furnishes summary to the U. S. Bureau of Mines.

Belgium
Leads to death within 30 days.

Czechoslovakia
Causes instantaneous death or leads to death, time not specified.

Tables of fatality rates close the book. What appears to be an unfortunate mistake gives France a startlingly bad record of 12.0, 10.3 and 8.6 per thousand workers underground for 1920, 1921 and 1922 respectively. That this is an error is suggested by another table which shows that in the years 1923, 1924 and 1925 the fatality rates were 10.1 11.5 and 12.8 per 10,000 underground workers respectively. What is a decimal place between friends!

The percentages of fatalities due to falls of ground relative to those from all causes in the United States and Great Britain are 50 per cent higher than in Belgium and Prussia. Can that be due to the shallowness of the mines in the former instances? Are shallow roofs more dangerous than deep ones?

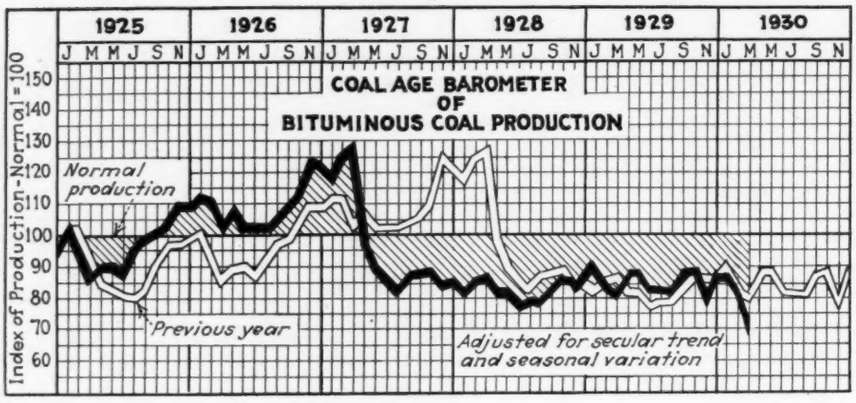
* * *

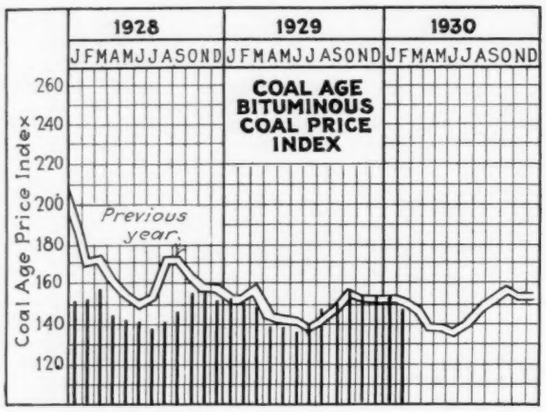
Coal Mine Mechanization, Year Book, 1929, American Mining Congress, Washington, D. C., G. B. Southward, Editor. 390 pp., 6x9⅛ in. Price, $3; cloth.

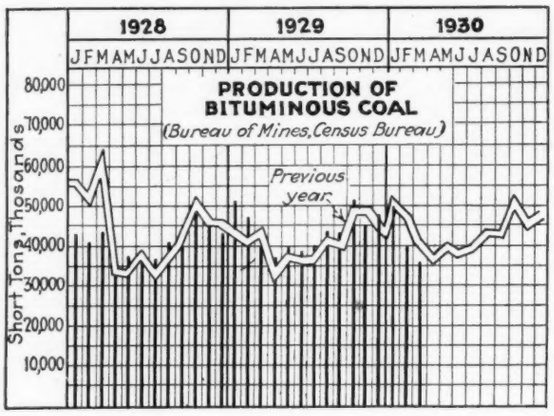
This review of the status of mechanization will be welcomed by the coal industry. New features are the chronology of mechanical loading, information regarding progress of other nations, and the safety of mechanized mining. The reports on mechanical loading, conveying mining, and scraper mining are correlated in this volume, and articles have been added on gathering haulage and pillar recovery. There are, as before, descriptions of the various loading machines, with illustrations and a bibliography of articles published on mechanized mining. The book has 132 more pages than last year and is printed in smaller type. Consequently, it contains more information, all of which appears to have been quite judiciously chosen.

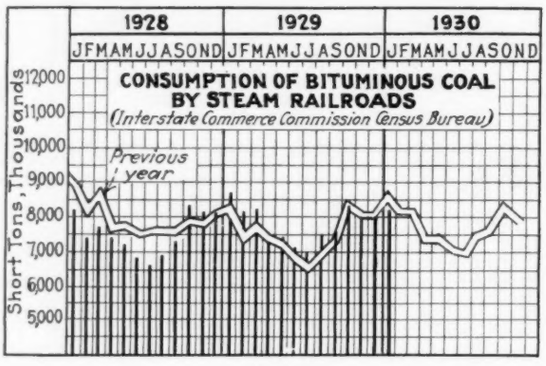
Operators will be pleased with the general specifications given as part of the description of each machine, especially where this includes the overall length, width, height, and the weight of the machine, its loading reach, its loading rate, its traveling speed, and the number and power of its motors. Much thought has been given evidently to improvement of this valuable annual.

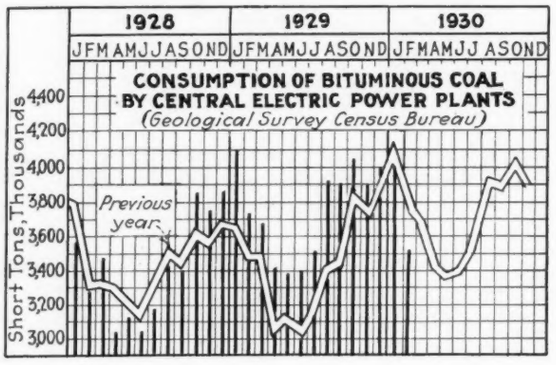
Indicators of Activities in the Coal Industry

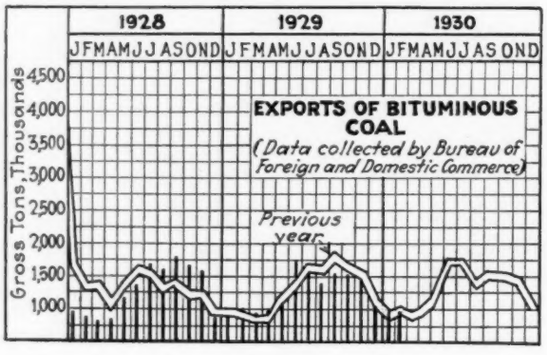


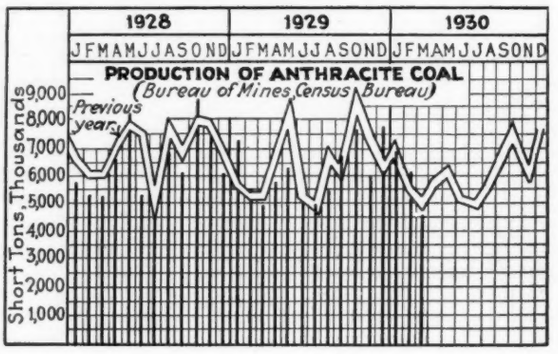












MARKETS in Review

SLUGGISHNESS featured the coal markets of the country in the month of March. Domestic demand was very slow, despite the cold snap which hit some of the principal markets at the last of the month, and resulted in a sharp curtailment in running time in most of the major producing fields. As a result, screenings were increasingly scarce with the decline in production of prepared sizes and moved into a much stronger position. Prices advanced materially on this size, largely, however, because of the scarcity, rather from any real demand.

Contracting, usually the most important item in the trade in the month of March, played only a minor rôle. Both retailers and industrial consumers manifested reluctance to sign up as long as the spot market answers their needs, and the few agreements signed called, in general, for reductions in prices. Stocking, as in the past, was conspicuous by its absence, largely due to satisfactory transportation and continuing peace in the industry.

March coal production is estimated by the U. S. Bureau of Mines at 35,740,000 net tons, a decrease of 3,815,000 net tons from that of February and 4,130,000 net tons from that of March last year. Prices showed a slight average decline for the first weeks of the month, but dropped sharply in most of the principal markets at the last. *Coal Age* Index of spot bituminous prices (preliminary) was: 143, March 1; 145, March 8; 144, March 15; 146, March 22; and 140, March 29. The corresponding weighted average prices were as follows: $1.73, March 1; $1.76, March 8; $1.74, March 15; $1.77, March 22; and $1.69, March 29. The revised Index figures for February were as follows: 149, Feb. 1; 150, Feb. 8; 147, Feb. 15; and 145, Feb. 22. Corresponding weighted average prices were: $1.80, Feb. 1; $1.82, Feb. 8; $1.78, Feb. 15; and $1.75, Feb. 22. The monthly Index for February was 147¾, as compared to the unrevised figure of 143⅜ for March. The weighted average price for March (unrevised) was substantially lower than that for the same month in 1929.

Dullness featured the anthracite markets in the month of March. Domestic demand was slow, despite a spell of colder weather at the last of the month. The outstanding development of the month was the action of the operators in changing the date of the spring price reduction from April 1 to May 1, in response to dealer sentiment. Of the various sizes sold, buckwheat, as in preceding months, was the only one that manifested any activity. The prevailing shortage in this size was accentuated by the curtailed running time made necessary by the reduced demand for domestic coal. Contracting was a minor item during the month, and consumers were still reluctant to add to reserves.

ONE of the worst snowstorms in the history of the weather bureau failed to revive domestic demand in the Chicago market in March. What business developed from the blizzard was enjoyed almost entirely by the retailers, who were able to work off a heavy surplus of high-priced coal. Southern Illinois operators revised price lists at the last of the month for the April trade. In addition, dealers' contracts were reissued, allowing additional tonnage to retailers in the coal-burning months on the basis of amounts taken in June, July, August, and September. The new circulars issued by the southern Illinois producers list lump and egg at $2.25, the same price as that at the beginning of the last coal year. This price compares with $3.15 prevailing during the winter just closed.

Along with the spring adjustments on southern Illinois coals came similar changes on central Illinois, Indiana, western Kentucky, and Eastern high- and low-volatile varieties. Central Illinois lump was listed at $1.70@$1.90, as compared to $2.40@$2.65 last winter; smokeless prepared sizes dropped 50c.@75c. to $2.50@$2.75, and mine-run went off 25c. to $2. Standard smokeless operators also announced a contract price on prepared coals. For the first time in the history of the field, a sliding scale has been established, providing for monthly advances and shipments to retailers in the winter months, based on tonnages taken on summer contracts.

APRIL circulars on Eastern high-volatiles showed sharp reductions. Block dropped from $2.75 in early March to $1.90@$2; and egg is priced at $1.50 up. Anthracite producers announced that there would be no spring price reductions until May 1, in line with the action taken in the East, though considerable objection to the policy developed among dealers.

Chicago retailers expect to treat practically all their coal during the coming year to make it dustless, and will absorb the cost, estimated at 7c.@12c. per ton, themselves. This figure compares with a premium of 25c. asked by operators who treat the coal at the mine. Dealers in Chicago also plan an extensive ad-

Current Quotations—Spot Prices, Anthracite—Gross Tons, F. O. B. Mines

		Week Ended						
		March 1, 1930		March 8, 1930	March 15, 1930	March 22, 1930	March 29, 1930	
	Market Quoted	Independent	Company	Independent	Independent	Independent	Independent	Company
Broken	New York	.....	$8.20@$8.50	.....	.....	.....	.....	$8.20@$8.50
Broken	Philadelphia	$8.40@$8.50	8.40	$8.40@$8.50	$8.40@$8.50	$8.40@$8.50	$8.40@$8.50	8.40
Egg	New York	8.60@ 8.70	8.70	8.60@ 8.70	8.60@ 8.70	8.60@ 8.70	8.60@ 8.70	8.70
Egg	Philadelphia	8.60@ 8.85	8.60	8.60@ 8.85	8.60@ 8.85	8.60@ 8.85	8.60@ 8.85	8.60
Egg	Chicago*	7.77	7.77	7.77	7.77	7.77	7.77	7.77
Stove	New York	9.10@ 9.20	9.20	9.10@ 9.20	9.10@ 9.20	9.10@ 9.20	9.10@ 9.20	9.20
Stove	Philadelphia	9.10@ 9.35	9.10	9.10@ 9.35	9.10@ 9.35	9.10@ 9.35	9.10@ 9.35	9.10
Stove	Chicago*	8.22	8.22	8.22	8.22	8.22	8.22	8.22
Chestnut	New York	8.65@ 8.70	8.70	8.65@ 8.70	8.65@ 8.70	8.65@ 8.70	8.65@ 8.70	8.70
Chestnut	Philadelphia	8.60@ 8.85	8.60	8.60@ 8.85	8.60@ 8.85	8.60@ 8.85	8.60@ 8.85	8.60
Chestnut	Chicago*	7.77	7.77	7.77	7.77	7.77	7.77	7.77
Pea	New York	4.75@ 5.00	5.00	4.75@ 5.00	4.75@ 5.00	4.75@ 5.00	4.75@ 5.00	5.00
Pea	Philadelphia	4.90@ 5.15	4.90	4.90@ 5.15	4.90@ 5.15	4.90@ 5.15	4.90@ 5.15	4.90
Pea	Chicago*	4.46	4.46	4.46	4.46	4.46	4.46	4.46
Buckwheat	New York	2.70@ 3.00	2.50†	2.70@ 3.00	2.70@ 3.00	2.70@ 3.00	2.70@ 3.00	2.50†
Buckwheat	Philadelphia	2.75@ 3.00	2.75	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75
Rice	New York	1.70@ 2.00	2.00	1.70@ 2.00	1.70@ 2.00	1.70@ 2.00	1.70@ 2.00	2.00
Rice	Philadelphia	2.00@ 2.25	2.00	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25	2.00
Barley	New York	1.40@ 1.50	1.50	1.40@ 1.50	1.40@ 1.50	1.40@ 1.50	1.40@ 1.50	1.50
Barley	Philadelphia	1.50@ 1.60	1.50	1.50@ 1.60	1.50@ 1.60	1.50@ 1.60	1.50@ 1.60	1.50

*Net tons, f.o.b. mines. †Domestic buckwheat, $3.25 (D. L. & W.).

vertising campaign, to extend over a period of years, at an annual cost of $100,000. The money will go for space in the newspapers in Chicago in a campaign to combat the inroads of gas, oil, and solid fuels other than coal.

SPRING adjustments in all the fields resulted in higher prices on steam coals. But despite the scarcity and the consequent higher prices, demand continued to lag. Spot buying has proved disappointing to dealers, who attribute the slowness to lagging industrial activity. Takings on contract have been below expectations. While activity in this phase of the trade in some quarters, particularly Illinois, is ahead of last year, Indiana and western Kentucky varieties find the sledding hard. Bad business conditions are given by buyers as the reason for decreased takings. A majority of the renewals are on the same price basis as last year, with a tendency on the part of some buyers to demand reductions of 5c.@10c.

Southern Illinois screenings are strong at $1.65@$1.75 for April, an increase of 15c. over March. Central Illinois screenings are firm at $1@$1.25; Indiana No. 5 screenings are soft at 85c.@$1; Indiana No. 4 product is tight at $1.40@$1.60, and, with little coal moving, western Kentucky screenings are quoted at 90c.@$1.10. Slack from Eastern mines is in better position than for some years. Low-volatile byproduct coal is quoted at $1.35@$1.50, with a number of contracts at higher figures, and ordinary high-volatile grades are selling at $1@$1.25. Best grades of free-burning coals are moving well. Increased demands on the byproduct slack supply lead dealers to predict a mine-run price in a few years.

Warm weather in the St. Louis area resulted in a slow market for domestic sizes, which was not thoroughly revived even by snow at the last of the month. Screenings output was materially reduced, but not enough to strengthen prices. New circular prices announced for April 1 are as follows: Standard (Ill.) lump and egg, $1.65@$1.75; steam nut, $1.40; mine-run, $1.50; screenings, $1.25@$1.35; Mt. Olive lump and egg, $1.75@$2; steam nut and stove, $1.50; mine-run, $1.65; screenings, $1.35@$1.40.

AFTER a period of comparative inactivity in the first part of March, business at the docks at the Head of the Lakes picked up, resulting in an estimated movement of 17,000 cars for the month. Inquiries for steam coal manifested a considerable improvement, and together with a satisfactory gain in iron mining in the Northwest, led dock operators to expect that last year's shipments will be exceeded. Screenings were limited in quantity and prices were firmly maintained, in company with those of other bituminous coals.

No material changes are expected in prices, which are as follows: Pocahontas lump, egg, and nut, $7.90@$8; stove, $7.75; mine-run, $5; screenings, $4.10; Kentucky block and lump, $6.60 @$7.25; stove and egg, $5.95; stove and dock-run, $6.05; stove, $5.90; dock-run, $4.75; screenings, $4.10; splint block, $5.85; egg, $5.60; stove, $5.35; dock-run, $4.75; screenings, $3.85; Youghiogheny block, lump, and egg, $5.75; stove, $4.75; dock-run, $4.50; screenings, $3.85; Hocking block, $5.60; lump and egg, $5.35; stove, $5.10; dock-run, $4.75; screenings, $3.85; anthracite egg and nut, $12.85; stove, $13.30; pea, $9.25; buckwheat, $7.45.

Lack of demand has resulted in the closing of most of the mines in the Southwest, and April 1 was little more than a date to the coal trade. Reduced production, however, resulted in firm prices on screenings, with the result that the March price of $1.75 will be advanced to $1.85 in April. Little contracting is being done, with prices at $1.65, as compared to $1.75 a year ago.

MILD weather in the month of March resulted in a continuance of slack conditions in both the steam and domestic trade in Colorado. Ruling prices in March were as follows: Walsenburg-Canon City lump, $5.50; nut, $4.50; mixed washed chestnut, $4.25; Trinidad coking lump, $3.75; nut, $3.50; chestnut, $3.25; Crested Butte anthracite 5x2-, 2½x1½- and 2x1-in. egg, $9; northern lignite lump, $2.75@$3; Rock Springs (Wyo.) lump, $4.25; nut, $3.75; Colorado and Wyoming steam coal, $1.35@$1.50.

Domestic demand in the Louisville market lagged in March as a result of mild weather, though a cold spell in the latter part of the month gave a slight fillip to buying. As a result of the slack demand, some operators in eastern Kentucky offered block as low as $1.25 to secure enough running time to fill contract orders for screenings. The latter size was strong throughout the month, more from a scarcity than from any real demand. Contracting was slow, as buyers showed a tendency to hold off as long as the satisfactory spot market continued.

Curtailment in production in March finally solved the smokeless coal problem which has been vexing the Cincinnati market for some time. In an attempt to hold the price level, circular prices of $3 for egg and $2 for lump were set at the first of the month. Severe cuts in the spot price, however, made contract and circular trading a hardship, largely because certain operators with favorable screenings contracts were able to sacrifice the larger sizes. But at the end of the month, the market did an about-face, April circulars quoting egg at $2.75 and lump at $2.50. Reduced production also strengthened the slack market and brought spot prices back to $1.40@$1.60, with some contracts closed as high as $1.65.

Curtailed production also enabled the high-volatile producers, especially those in southeastern Kentucky, to hold up prices until the middle of the month. But with the approach of April 1, reductions in prices were made in the varieties most heavily traded in, though premium coals stayed at the higher level. Egg was neglected, and mine-run and nut were steady. Slack was the greatest beneficiary of the reduced running time. At

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

LOW-VOLATILE, EASTERN	Market Quoted	Week Ended Mar. 1, 1930	Mar. 8, 1930	Mar. 15, 1930	Mar. 22, 1930	Mar. 29, 1930
Smokeless lump	Columbus	$2.50@$3.25	$2.50@$3.25	$2.50@$3.00	$2.50@$3.00	$2.50@$3.00
Smokeless mine-run	Columbus	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Smokeless screenings	Columbus	1.25@ 1.50	1.25@ 1.50	1.35@ 1.50	1.35@ 1.50	1.40@ 1.60
Smokeless lump	Chicago	2.25@ 3.00	2.25@ 3.00	2.25@ 3.00	2.25@ 3.00	2.25@ 2.75
Smokeless mine-run	Chicago	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25
Smokeless lump	Cincinnati	2.50@ 3.00	2.25@ 2.75	2.00@ 2.75	2.25@ 2.75	2.50
Smokeless mine-run	Cincinnati	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25
Smokeless screenings	Cincinnati	1.25@ 1.50	1.25@ 1.40	1.35@ 1.60	1.40@ 1.60	1.40@ 1.60
*Smokeless mine-run	Boston	4.20@ 4.30	4.15@ 4.25	4.15@ 4.25	4.15@ 4.20	4.10@ 4.15
Clearfield mine-run	Boston	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60
Cambria mine-run	Boston	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00
Somerset mine-run	Boston	1.50@ 1.80	1.50@ 1.80	1.50@ 1.80	1.50@ 1.80	1.50@ 1.80
Pool 1 (Navy Standard)	New York	2.20@ 2.30	2.20@ 2.30	2.20@ 2.30	2.20@ 2.30	2.20@ 2.30
Pool 1 (Navy Standard)	Philadelphia	2.35@ 2.60	2.35@ 2.60	2.35@ 2.60	2.35@ 2.60	2.35@ 2.60
Pool 9 (super. low. vol.)	New York	1.90@ 2.25	1.90@ 2.25	1.90@ 2.25	1.90@ 2.25	1.90@ 2.25
Pool 9 (super. low. vol.)	Philadelphia	1.90@ 2.15	1.90@ 2.15	1.90@ 2.15	1.90@ 2.15	1.90@ 2.15
Pool 10 (h. gr. low. vol.)	New York	1.75@ 1.85	1.75@ 1.85	1.75@ 1.85	1.75@ 1.85	1.75@ 1.85
Pool 10 (h. gr. low. vol.)	Philadelphia	1.75@ 1.95	1.75@ 1.95	1.75@ 1.95	1.75@ 1.95	1.75@ 1.95
Pool 11 (low. vol.)	New York	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75
Pool 11 (low. vol.)	Philadelphia	1.55@ 1.75	1.55@ 1.75	1.55@ 1.75	1.55@ 1.75	1.55@ 1.75
HIGH-VOLATILE, EASTERN						
Pool 54-64 (gas and st.)	New York	$1.10@$1.30	$1.10@$1.30	$1.10@$1.20	$1.10@$1.20	$1.10@$1.20
Pool 54-64 (gas. and st.)	Philadelphia	1.15@ 1.35	1.15@ 1.35	1.15@ 1.35	1.15@ 1.35	1.15@ 1.35
Pittsburgh sc'd gas	Pittsburgh	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Pittsburgh gas mine-run	Pittsburgh	1.60@ 1.75	1.60@ 1.75	1.65@ 1.75	1.65@ 1.75	1.65@ 1.75
Pittsburgh mine run	Pittsburgh	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65
Pittsburgh slack	Pittsburgh	.90@ 1.00	.90@ 1.00	.90@ 1.10	1.00@ 1.10	1.00@ 1.20
Kanawha lump	Columbus	2.00@ 2.40	2.00@ 2.45	2.00@ 2.40	2.00@ 2.40	2.00@ 2.40
Kanawha mine-run	Columbus	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50
Kanawha screenings	Columbus	.85@ 1.00	.85@ 1.00	.85@ 1.00	.90@ 1.10	1.10@ 1.20
W. Va. lump	Cincinnati	1.75@ 2.50	1.75@ 2.25	1.65@ 2.25	1.65@ 2.25	1.60@ 2.25
W. Va. gas mine-run	Cincinnati	1.35@ 1.50	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60
W. Va. steam mine-run	Cincinnati	1.10@ 1.35	1.10@ 1.35	1.15@ 1.35	1.15@ 1.35	1.15@ 1.35
W. Va. screenings	Cincinnati	.75@ 1.00	.90@ 1.15	1.00@ 1.25	1.00@ 1.15	1.10@ 1.25
Hocking lump	Columbus	2.00@ 2.15	2.00@ 2.15	2.00@ 2.15	2.00@ 2.15	2.00@ 2.10
Hocking mine-run	Columbus	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60
Hocking screenings	Columbus	.75@ .90	.75@ .90	.80@ 1.00	.85@ 1.10	.85@ 1.00

*Gross tons, f.o.b. vessel, Hampton Roads.

the last of the month quotations were $1@$1.10, as compared to 75c. in the first part.

DESPITE a cold spell at the end of March, domestic business in the Columbus market fell off materially during the month. Coal from all the fields suffered, and retailers, instead of buying to keep up their reserves, devoted their attention to cleaning up their yards. With reserves at a low point, the dealers are not expected to do much stocking in the summer months. Retail prices were steady at the level prevailing for most of the winter.

Contracting attracted the bulk of the attention in the steam trade during the month. Under a new policy, large users are buying a greater proportion of their needs for the coming year, rather than resorting to the spot market. The strength manifested by slack is responsible for this change of heart. Utilities and iron and steel plants are contracting for 95 to 100 per cent of their requirements at advances of 10c.@15c. Railroad contracts are yet to come, as is the lake business. The latter, upon its arrival, is expected to relieve the domestic situation. Until then, producers and distributors are looking after contract business.

After a month of decline, activity in the Pittsburgh market increased at the last of March in preparation for the coming lake season. Domestic demand passed out of the picture altogether during the month. In response, the slack market made a sharp recovery, with steam slack rising from 65c.@75c. at the first of the month to 80c.@$1 at the last. Industrial use also fell off during the month, despite prospects of improved running time at manufacturing establishments. Contracting was carried on quietly in March, but the number of agreements closed was less than in previous years.

An unvarying dullness pervaded the central Pennsylvania market in March. Operators ascribed the slack demand to a decrease in business activity, but are hopeful of improvement in the near future. Production was curtailed, but despite these measures the number of "no bills" rose to 1,900 at the end of the month. Prices showed little change, those prevailing at the last of the month being as follows: Pool 1, $2.25@$2.40; Pool 71, $2.10@$2.20; Pool 9, $1.90@$2; Pool 10, $1.75@$1.90; and Pools 11 and 18, $1.60@$1.70.

In New England, the steam coal market was very slack in March. Prices, partly influenced by the large tonnages on cars at the Virginia terminals, slid down until $4.15 was the top figure on Navy Standard smokeless mine-run. In order to free cars, several shippers sent cargoes forward on consignment. Consumers took coal very sparingly.

Because of the slack domestic demand, nut-and-slack developed a scarcity, and prices rose from $3.97, f.o.b. Virginia terminals, to $4.09 per gross ton. On cars at Boston for inland delivery, the best grades of smokeless mine-run were quoted at $5.50@$5.60 the last of the month, with some dealers asking $5.65@$5.70. Stoker coals sold as high as $5.25, though a number of sales were made at $5.10@$5.15. All-rail business on central Pennsylvania coal lagged during the month. A few shippers were able to place tonnages, but only at the minimum price.

March proved to be a slightly better month in the Birmingham market than February, with both the retailers and the operators benefiting by the cold weather. Dealers, however, confined their orders to only immediate needs, with the result that their yards were bare at the last of the month. New prices put into effect March 19 stimulated buying a little, but contracting continued to be in the minority. April prices are as follows: Cahaba lump, $3@$3.75; nut, $2.25@$2.75; Black Creek lump, $3.25@$3.50; nut, $2.75; Carbon Hill lump and egg, $2; nut, $1.65@$2; Big Seam lump, egg, and nut, $1.75; Corona lump and egg, $2.50; nut, $2.35; Aldrich lump and egg, $4.75; nut, $2.75; Dogwood lump, $4.50; Straven lump, $3.75; nut, $2.50.

THE commercial market was practically unchanged from February, with spot sales light and contract shipments slow. Bunkering produced only an occasional small order. Quotations were as follows: Cahaba mine-run, $2@$2.25; washed 3-in. lump, $1.75@$2; slack, $1.50; Black Creek washed, $2@$2.25; Pratt mine-run, $1.60@$1.75; Corona mine-run, $1.90; washed, $1.80@$2; Carbon Hill mine-run, $1.75@$1.90; washed, $1.50@$1.90; slack, $1.25; Big Seam washed mine-run, $1.60@$1.75; washed, $1.50@$1.75; slack, $1.25.

Inactivity featured the New York market in March. Consumers showed little interest in rebuilding stocks. Some contracting was done, but the total business was far below usual. Prices, despite the slowness of the market, showed little change over the month.

Bituminous tonnage slumped sharply in the Philadelphia market in March. Though a decline is expected at this season, it was more severe than usual for the month of March. Contract buyers continued to hold aloof. Prices were unchanged from previous months.

CONTINUED dullness featured the New York anthracite market in March. Even a slight touch of cold at the end of the month failed to stir up a demand for domestic sizes. The action of the producers in changing the date of price reductions from April 1 to May 1 had only an academic interest to the trade. What little strength there was in the market was shown by buckwheat, and this was fostered by the curtailed running time at the mines, increasing the prevailing scarcity of this size.

Mild weather in Philadelphia materially slowed the anthracite trade. The only outstanding incident of the month was the change in the date for the spring price reduction from April 1 to May 1. However, steam coals will be priced from April 1 as usual. Contract prices for the new year are as follows: Buckwheat, $3; rice, $2; barley, $1.50.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

		Week Ended				
MIDDLE WEST	Market Quoted	Mar. 1, 1930	Mar. 8, 1930	Mar. 15, 1930	Mar. 22, 1930	Mar. 29, 1930
Franklin, Ill. lump	Chicago	$3.15	$3.15	$3.15	$3.15	$2.25
Franklin, Ill. mine-run	Chicago	2.15	2.15	2.15	2.15	2.15
Franklin, Ill. screenings	Chicago	1.30@ 1.60	1.30@ 1.60	1.30@ 1.60	1.30@ 1.60	1.30@ 1.60
Central, Ill. lump	Chicago	2.40@ 2.65	2.40@ 2.65	2.40@ 2.65	2.40@ 2.65	1.75@ 1.90
Central, Ill. mine-run	Chicago	1.70@ 1.85	1.70@ 1.85	1.70@ 1.85	1.70@ 1.85	1.60@ 1.75
Central, Ill. screenings	Chicago	.75@ 1.00	.75@ 1.00	.75@ 1.00	.75@ 1.00	.90@ 1.25
Ind. 4th Vein lump	Chicago	2.85@ 3.00	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75
Ind. 4th Vein mine-run	Chicago	1.50@ 2.10	1.50@ 2.10	1.50@ 2.10	1.50@ 2.10	1.50@ 2.10
Ind. 4th Vein screenings	Chicago	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60
Ind. 5th Vein lump	Chicago	1.75@ 2.20	1.75@ 2.20	1.75@ 2.20	1.75@ 2.20	1.75@ 2.20
Ind. 5th Vein mine-run	Chicago	1.25@ 1.75	1.25@ 1.75	1.25@ 1.75	1.25@ 1.75	1.25@ 1.75
Ind. 5th Vein screenings	Chicago	.65@ 1.00	.65@ 1.00	.65@ 1.00	.65@ 1.00	.80@ 1.00
Mount Olive lump	St. Louis	2.10@ 2.50	2.10@ 2.50	2.10@ 2.50	2.10@ 2.50	1.75@ 2.00
Mount Olive mine-run	St. Louis	1.75	1.75	1.75	1.75	1.65
Mount Olive screenings	St. Louis	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25	1.35@ 1.45
Standard lump	St. Louis	2.25	2.25	2.25	2.25	1.65@ 1.75
Standard mine-run	St. Louis	1.65@ 1.75	1.65@ 1.75	1.65@ 1.75	1.65@ 1.75	1.50
Standard screenings	St. Louis	.35@ .75	.50@ .90	.50@ .90	.50@ .90	1.25@ 1.35
West Ky. block	Louisville	2.00@ 2.25	2.00@ 2.25	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75
West Ky. mine-run	Louisville	.90@ 1.25	.90@ 1.25	.90@ 1.25	.90@ 1.25	.90@ 1.25
West Ky. screenings	Louisville	.30@ .50	.60@ .75	.50@ .80	.75@ .90	.90@ 1.00
West Ky. block	Chicago	1.75@ 2.00	1.75@ 2.00	1.65@ 1.75	1.65@ 1.75	1.50@ 1.75
West Ky. mine-run	Chicago	.85@ 1.00	.85@ 1.00	.85@ 1.00	.85@ 1.00	.85@ 1.00
SOUTH AND SOUTHWEST						
Big Seam lump	Birmingham	$1.75	$1.75	$1.75	$1.75	$1.75
Big Seam mine-run	Birmingham	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75
S. E. Ky. block	Chicago	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50	1.90@ 2.00
S. E. Ky. mine-run	Chicago	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.25@ 1.60
S. E. Ky. block	Louisville	2.25@ 2.75	2.00@ 2.50	2.00@ 2.50	1.75@ 2.25	1.75@ 2.25
S. E. Ky. mine-run	Louisville	1.25@ 1.60	1.25@ 1.60	1.25@ 1.60	1.25@ 1.60	1.25@ 1.60
S. E. Ky. screenings	Louisville	.60@ .90	.80@ 1.10	.80@ 1.25	.90@ 1.25	1.00@ 1.25
S. E. Ky. block	Cincinnati	2.50@ 3.00	2.50@ 3.00	2.50@ 3.00	2.50@ 3.00	2.50@ 3.00
S. E. Ky. mine-run	Cincinnati	1.10@ 1.50	1.15@ 1.50	1.15@ 1.60	1.10@ 1.50	1.15@ 1.50
S. E. Ky. screenings	Cincinnati	.75@ 1.10	.90@ 1.25	.90@ 1.25	1.00@ 1.25	1.00@ 1.25
Kansas shaft lump	Kansas City	3.75@ 4.25	3.75@ 4.25	3.75@ 4.25	3.75@ 4.25	3.75@ 4.25
Kansas strip lump	Kansas City	3.00@ 3.25	3.00@ 3.25	3.00@ 3.25	3.00@ 3.25	3.00@ 3.25
Kansas mine-run	Kansas City	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75
Kansas crushed mine-run	Kansas City	1.75	1.75	1.75	1.75	1.75
Kansas screenings	Kansas City	1.75	1.75	1.75	1.75	1.75

WORD from the FIELD

Harris & Ewing

Carroll B. Huntress

Gandy Resigns N.C.A. Post; Huntress Succeeds Him

Harry L. Gandy, for seven years executive secretary of the National Coal Association, with headquarters in Washington, D. C., has resigned to become president of Pattison & Bowns, Inc., a wholesale coal company controlled by the Pittston Co. Mr. Gandy, who was born in Churubusco, Ind., in 1881, was graduated from Tri-State College, Angola, Ind., in 1901, and in that year began a newspaper career that lasted until Aug. 1, 1928. In addition he was active in politics and served three terms in the House as Representative from the Third South Dakota District. He became connected with the coal business ten years ago, and joined the National Coal Association in 1923.

Carroll B. Huntress, Mr. Gandy's assistant for three years, succeeds to the secretaryship of the association. Mr. Huntress is a native of New Hampshire and a Harvard graduate. After leaving school, he was engaged in newspaper work for ten years and then went into organization work in Indiana, Ohio, Pennsylvania and, from 1919 on, in Washington, D. C. In 1924, he became associated with the National Coal Association and was director of information service until it was discontinued three years ago.

Harry L. Gandy

Plan Natural Gas Line

Completion of preliminary negotiations for the construction of a 1,300-mile natural-gas pipe line system to bring gas from the Panhandle fields of Texas to Chicago, Detroit, and surrounding territories was announced by Insull, Son & Co., Chicago, on April 2. The project, to cost $100,000,000, will be shared by a group of public utility and oil interests, including the Cities Service Co., the Insull interests, Standard Oil Co. of New Jersey, Columbian Carbon Co., Texas Corporation, Phillips Petroleum Co., and Skelly Oil Co.

Preliminary work is being undertaken to build two parallel 16- and 24-in. lines with a daily capacity of 300,000,000 cu.ft. of gas. The main line will extend from Amarillo, Texas, to Chicago, with branch lines to Kansas City and Detroit. Gas engineers estimate that 100,000,000 cu.ft. of gas can be delivered in Chicago daily when the line is completed At Kansas City, the system will connect with the Cities Service line serving Kansas, Missouri, Oklahoma, and adjoining states.

Fire Destroys Tipple

The tipple of the Dixie-Darby Coal Co., near Whitesburg, Ky., built less than a year ago, was destroyed by fire a short time ago with a loss reported to be $40,000. Some 300 men are temporarily out of work, though it has been announced that the structure will be replaced as soon as possible.

William von Meding

Engineers Sail for Russia

The second corps of Allen & Garcia Co. engineers for service in Russia sailed March 29, on the steamer "George Washington" for Tomsk, Siberia, where they will handle the design and construction in connection with the development of all the new coal mines in that area.

The party consists of the following: chief of party, William von Meding, Chicago; mining engineers, G. E. Breckenridge, Chicago, and H. C. McCollum, Benton, Ill.; stripping engineer, Wm. E. Mullins, Jr., Chicago; structural engineers, Franklin Rogers and Wm. Trommer, Chicago; mechanical engineers, A. I. Sandels, A. A. Sandaker, and M. A. Matthews, Chicago, and Leland S. Becker, Fairmont, W. Va.; electrical engineer, W. M. Hodson, Chicago. Andrews Allen, of the Allen & Garcia Co., expects to sail in April to spend a month in the Don Basin and Kuznetz Basin.

West Virginia Blast Kills 12

Twelve miners were killed in an explosion in the Yukon mine of the Crown Coal Co., near Arnettsville, W. Va., which occurred at 2 a.m., March 26. Seven others who were in the workings walked out unharmed. The cause of the explosion is said to have been the ignition of a pocket of gas by a locomotive. Two hundred men ordinarily are employed on the day shift.

Insurgents Split United Mine Workers; Indiana Contract Signed

SECESSIONIST activities, which culminated in an insurgent convention of mine workers at Springfield, Ill., March 10, under the auspices of District 12 (Illinois), caused a split in the ranks of the United Mine Workers last month. The avowed purpose of the convention, attended by about 450 delegates from Illinois, Ohio, Kansas, Pennsylvania, and other states, was "to adopt an international organization of the United Mine Workers of America; to adopt an international constitution that will place control of the organization in the hands of the rank and file, and to adopt ways and means to accomplish the complete reorganization of the United Mine Workers of America."

An attitude of suspicion as to the motives of the Illinois officers present, who were characterized as "crooks playing politics," pervaded the "rank and file," however, and provoked bitter wrangling when the question of convention officers came up. The first action of the delegates was to oust Harry Fishwick, president of the Illinois miners and a leader in the reorganization movement, and elect Alexander Howat, president, District 14 (Kansas), chairman of the convention. Bitter attacks also were launched on Powers Hapgood, Pennsylvania; John H. Walker, president, Illinois Federation of Labor, and Walter Nesbit, secretary-treasurer of the Illinois miners, all of whom were candidates for the office of secretary of the meeting. Nesbit was finally elected.

Further evidence of the temper of the convention was shown in resolutions demanding the resignation of Fishwick and Nesbit from their offices in the union, which were finally voted down, and in the opposition to seating Frank Farrington, former Illinois president and an old foe of Lewis, as a delegate.

Insurgent delegates adopted a constitution at 11:21 a.m., March 10. The first article of the constitution stated that "this organization shall be known as the United Mine Workers of America." Other articles adopted later included provisions for a drastic cut in officers' salaries; election of delegates to the American Federation of Labor convention to be held in Boston, Mass., in October; a policy of sending organizers only to districts which are unorganized, and a six-hour day from "bank to bank." On March 11, the convention amended the constitution to include provision for a five-day week.

After adopting the first article of the constitution on March 10, the insurgents declared vacant all the international offices from president down to secretary, with the exception of Alexander Howat as temporary president. On March 12, the convention approved a resolution to take legal action to oust Lewis and to restrain him and Thomas Kennedy, secretary-treasurer of the United Mine Workers, from disbursing any of the money in the treasury, and also addressed an appeal for help to the Senate Labor Committee. Delegates on March 13 rejected a proposal that William Green, president, American Federation of Labor, be invited to "lay his cards" before the convention.

The insurgent convention closed on March 15 with the election of the following international officers: president, Alexander Howat; vice-president, Adolph Germer, Illinois, and secretary-treasurer, John H. Walker. The last action of the delegates was to address a letter to President Green, of the American Federation of Labor, asking that he present a peace proposal to the Lewis convention.

MEANWHILE, the 31st "consecutive" constitutional convention of the United Mine Workers, under the leadership of Lewis, opened in Indianapolis, Ind., with 1,000 delegates attending. The convention immediately approved the postponement of the 1929 constitutional convention and adopted a constitution at 12:01 p.m., 40 minutes after a similar action at the insurgent convention. The convention took its orderly course on March 10, but in the morning of the next day, delegates from the hard-coal fields of Pennsylvania took charge and demanded an airing of the Illinois situation. This got under way in the afternoon, when "men from the mines" began to tell "the truth about Illinois affairs," as promised by President Lewis. A long list of speakers then began a detailed account of "corruption and lawlessness" in Illinois, which lasted four days.

Direct blows at the control of Lewis came on March 14, when a number of resolutions demanding his resignation were reported out of the committee. Other resolutions proposed severe salary cuts; asked that the term of office be not more than four years, after which the officers must return to the mines for two years; and that the payment of expense accounts be eliminated.

On March 17, President Green, of the American Federation of Labor, addressed the convention and pledged the aid of his organization to the Lewis group in its fight against the insurgents, though he held open the door to possible reconciliation of differences in the future. The next day, the convention authorized the international executive committee to call the insurgent leaders before it for trial on charges of rebellion and treason to the union, under penalty of expulsion for refusal, and by constitutional amendments granted surpreme power to the international executive committee. After adopting this amendment, the convention gave the president power to revoke the charters of insubordinate locals, subject to review by the executive board, and to set up provisional governments where charters were revoked. Further, the international president was granted full power to carry on the work of the union between meetings of the executive committee.

Anthracite delegates again took the floor on March 19, with bitter attacks on Lewis and his administration. They made unsuccessful attempts to have organizers and field workers elected rather than appointed, and to have assessments limited to two a year, with a maximum of $4. On the same day, the convention approved a resolution asking for the revocation of the charter of District 14 and the setting up of a provisional government.

The convention on March 20 also adopted the report of the scale committee which recommended that "every effort be made to have all contracts in the bituminous region expire on the same date, and to that end every effort should be made to have the contracts about to be negotiated expire April 1, 1932." If wage agreements are negotiated to expire on that date, it would, in effect, reconstitute the old Central Competitive Field, and allow a national strike of miners.

The Lewis convention closed on March 20, and on March 26, President Lewis revoked the charter of District 14, headed by Howat before his election to the presidency of the insurgent miners, and appointed Henry Allai and Joseph E. Promek provisional president and provisional secretary, respectively, instructing them to return to Kansas immediately and take charge of the union's affairs. Howat's followers announced that they would refuse to give up the union records and would take legal steps to prevent the Lewis executives from taking control. While discussion on the Kansas situation con-

Coal Slogan Prizes Awarded

Winners in the contest for a slogan for the use of the coal industry have been announced by the National Retail Coal Merchants' Association, which conducted the campaign. Herbert F. Moeller, student-instructor, University of Illinois, won the first prize, of $500, with the acrostic "Comfort of American Life." The second prize of $200, was won by "Use coal—unless you have money to burn," submitted by Mrs. James M. Tribble, Senoia, Ga. Third prize, of $100, went to Lewis C. Tee Garden, radio announcer, Portland, Ore., who says "Burn coal—2,000 reasons in every ton." Thirty-four other contestants received awards.

Slogans are copyrighted, and written certificates granting the right to use will be given all members of the National Retail Coal Merchants' Association, National Coal Association, Anthracite Operators' Conference, and American Wholesale Coal Association.

tinued, the injunction preventing Lewis from ousting the officers of the rebellious Illinois district was sustained by the appellate court on April 4, leaving Fishwick and his cohorts in power.

Aside from the quarrel between union members, the signing of a new contract between the United Mine Workers and the Indiana shaft operators held the stage. The parley opened on March 31, and was meeting rather heavy weather until President Lewis intervened to smooth out the difficulties. The new agreement, to run for one year, was signed April 2, and retains the 1929 wage scale of $6.10 for day work and 91c. and 79c. for pick and machine-mined coal, respectively. Reports are that the arbitration clause in the old contract, which the miners objected to, was retained.

In order to force the operators to recognize the insurgent branch of the United Mine Workers, Howat announced on April 3 that he may call a strike of the Kansas miners. W. L. A. Johnson, commissioner, Southwest Interstate Coal Operators' Association, has stated that the association will deal only with officials recognized by the faction headed by Lewis. The wage contract in Kansas runs until April 1, 1931.

Dissatisfaction with the Lewis régime continued to agitate anthracite delegates after the close of the 31st constitutional convention, as witnessed by the following United Press despatch from Shamokin, Pa.: "A resolution for a separate anthracite union will be introduced at the next national convention of the United Mine Workers of America by the Bear Valley local, it has been decided here. Bituminous locals are being favored to the disadvantage of the anthracite miners, the local union believes. Union leaders in other locals had no comment to make on the proposal, but it is believed many of them will follow the lead of the Shamokin miners."

Financial Reports Issued

Pacific Coast Co. and subsidiaries, excluding the Pacific Coast Cement Co., report a net profit of $155,398 after taxes, interest, and other charges for the year 1929. This is equivalent, after first preferred dividend requirements, to $1.95 a share on 40,000 shares of $100 par value 4 per cent preferred stock, as compared with a net loss of $21,625 in the preceding year.

For the year ended Dec. 31, 1929, the Island Creek Coal Co. reports a net income of $3,198,100 after depreciation, depletion, federal taxes and other charges, equivalent, after preferred dividend requirements, to $5.04 on 593,865 shares of common stock, against $2,889,991, or $4.46 a share, in the preceding year.

Consolidation Coal Co., for the year 1929, reports net income of $287,045 after federal taxes, amortization, depreciation, depletion, interest, and other charges, equivalent to $2.87 a share on 100,000 shares of 7 per cent preferred stock. Total current assets amounted to $15,130,121 and total current liabilities to $4,694,070, leaving a net working capital of $10,436,050 for the year.

For the year 1929, the Elk Horn Coal Corporation reports net profits of $47,729 after depreciation, interest, and other charges, equivalent to 36c. a share on 132,000 shares of 6 per cent preferred stock, against $19,992, or 15c. a share on the preferred stock, in the year 1928.

New River Co. reports for 1929 a net profit of $588,426 after charges, depreciation and federal taxes, equivalent to $7.98 a share on 73,639 shares of 6 per cent preferred stock. This compares with net profits of $390,109, or $5.30 a share, in 1928.

Pittsburgh Terminal Coal Corporation and subsidiaries report a net loss of $696,527 after depreciation, depletion, etc., for the year 1929, as compared to a net loss of $893,003 for the year 1928.

American Coal Co. for the year 1929 reports a net income of $177,908, after federal taxes, depreciation, depletion, and other charges, equivalent to $3.63 a share on 48,900 shares of stock. This compares with $197,677, or $4.03 a share, in 1928.

Kentucky Blast Kills Sixteen

Sixteen men were killed in an explosion in the mine of the Pioneer Coal Co., at Kettle Island, Ky., March 29. Only a few of the 400 men normally employed were in the mine at the time of the blast, which tore down stoppings and doors and filled the entries with débris. Fifteen bodies had been recovered by April 3, and the search for that of the mine foreman was being pushed by rescue crews. The cause of the explosion has not yet been determined.

Lopez Anthracite Mines Sold

Erection of a large power-generating station in the anthracite field and operation of long-distance transmission lines is planned by the Anthracite Power & Utilities Co., New York City, which has purchased the mine of the Northern Anthracite Coal Co., at Lopez, Sullivan County, Pa. In addition to its power-generation program, the company also contemplates the extension of the sale of Lopez coal to the tidewater and New England territory, and expects to take over a number of retail yards to facilitate this move. Leasing of additional coal areas is said to be also a part of the program of expansion.

Five Killed in Utah Mine

Five men were killed in an explosion in the new Peerless mine of the Peerless Coal Co., Price Canyon, Utah, March 8. Eight men escaped alive after the blast, which was thought to have been caused by the ignition of a pocket of gas by a cutting machine. Little damage was done to the mine workings or surface plant.

Lake Cargo Coal Complaints Accepted by I.C.C.

Complaints filed with the Interstate Commerce Commission by the Ohio and Pennsylvania coal producers in the Lake cargo coal case have been given numbers by the Commission. The complaint filed by the Ohio operators will be officially known as Docket No. 23240, and that of the Western Pennsylvania Coal Traffic Bureau as Docket No. 23241. No time or place has been set for the hearing of these complaints.

Two Killed, Eighty-Seven Saved In Ohio Mine Fire

Two men were killed and 87 escaped from a mine-fire in the Wolf Run mine of the Warner Collieries Co., near Amsterdam, Ohio, which broke out March 10. Sparks caused by a loaded car jumping the track 6,000 ft. back in the mine, a shaft operation, started the blaze, which spread rapidly throughout the workings.

Safety Achievements Rewarded

Recognition of individual performances of outstanding meritorious service in the saving of life at personal risk, and of exceptional safety achievements on the part of companies and organizations in the mining and allied mineral industries was given at the last meeting of the Joseph A. Holmes Safety Association, in Washington, D. C. Awards of thirteen medals and certificates of honor were made to eleven men engaged in coal mining and two men engaged in metal mining. Certificates of honor were given to three metal-mining companies, nine coal-mining companies, two cement organizations, one smelter, one individual, and one organization engaged in both coal and metal mining.

Awards for feats of individual heroism were made to the following men in the coal industry: James Dillaplane, Albert Lehman, Harry Nye, and Forrest Renn, miners, Cameron Colliery, Susquehanna Colliery Co., Shamokin, Pa.; Randolph Ashby, superintendent, Chapman Coal Mining Co., Barton, Md., and E. R. Jobes, James Hogan, Edward L. Haas, John A. Kearney, John J. Murhamer, James McGuire, and Robert Steven, officials of the Kinloch mine, Valley Camp Coal Co., Parnassus, Pa.

Certificates of honor were awarded the following coal-mining companies or mines: western division, DeBardeleben Coal Co., Jasper, Ala.; Newcastle No. 2 and No. 6 mines, Newcastle, Ala.; West Virginia division, Consolidation Coal Co., Fairmont, W. Va.; Odin mine, Odin Coal Co., Odin, Ill.; Elizabeth mine, W. B. Skelly Coal Co., Export, Pa.; Superior Coal Co., Gillespie, Ill.; Adrian mine, Rochester & Pittsburgh Coal Co., Indiana, Pa.; Sheridan-Wyoming Coal Co., Sheridan, Wyo., and the Shamrock mine, Shamrock Coal Co., Frederick, Colo.

Budgeting Enables the Mine Management To Chart Future Progress

MINING MEN are likely to think that the budget system will give them no practical assistance in the solution of their particular problems, reasoning that sudden and wide fluctuations will cause the projected results to vary so greatly from the actual as to be valueless, said Ernest L. Bailey, of the firm of Wadleigh & Bailey, consulting engineers, Washington, D. C., at a meeting of the Southern Appalachian Efficiency Association, Knoxville, Tenn., March 15. Other industries, however, have successfully applied budgeting under similar circumstances, and "changes in the operating and marketing conditions, fluctuations in production costs and sales realization, and curtailment or expansion of operations to meet the exigencies of a changing demand, constitute, in themselves, the most potent arguments in favor of a budget system."

In a basic industry, such as coal mining, where price and demand react promptly to seasonal conditions or changing industrial activity, a budget system, properly constructed and applied, is the most reliable instrument through which such changes may be brought clearly to the eye of the management. The assumption that the application of budgeting requires a high degree of technical skill is erroneous, though a certain amount of experience, of course, is necessary. The most important point is that the budget meet the specific needs of the company it serves. "In any organization, the establishment and perfection of a budget system will require at least one year, frequently longer, but during most of this time, while results will be short of possible attainment, it will be rendering a worth-while service, more than paying its way." Much of its value at any time will depend upon the sympathetic support of the executive who exercises control over its operation.

If the budget is properly constructed, carefully compiled, and efficiently controlled, it will accomplish the following results: Set up a picture of the contemplated sales, production, and financial programs for a given period, indicating the probable profit or loss; emphasize the relationship between current costs and sales realization, thus pointing the way to the prompt application of corrective measures; call for an intensive study and analysis of production costs, leading to increased operating efficiency; tend to lead to the establishment of sound sales policy, and analyze contemplated expenditures from the standpoint of the benefits which may accrue.

In coal mining, the budget should be set up by months, and the budgetary period should cover at least six months. It should be revised monthly to reflect changes occurred or foreseen. Results should be carefully checked with actual figures, and reasons for marked discrepancies should be ascertained and recorded. The successful operation of the budget system necessitates accurate, detailed cost keeping for all departments, which, of course, should be done regardless of whether or not a budget is kept.

The actual work of devising a budget for a commercial coal mine involves a detailed study of all factors which influence its business, and will vary with different companies. However, in general, the following items must be determined: Estimated price and tonnage by months of each grade or size produced which can be sold during the budgetary period; the selling and administrative cost per ton of the product expected to be sold; the estimated tonnage and cost of production by months. Usually, the tonnage to be produced will be limited by the sales estimate rather than productive capacity, and a thorough study of the entire situation will be necessary to arrive at the operating time, the sections or mines from which the tonnage is to be obtained, number of men required, extraordinary operation expenditures necessary or contemplated for betterment or reconditioning of the mine or plant, major repairs, etc.; estimated revenue from miscellaneous sources; capital expenditures authorized or in progress, and interest charges to be met or additional financing required to carry out the program.

"The budget in its finished form constitutes the carefully considered opinion of the management as to what the company's program should be during the budgetary period; what sales realization, production cost, and profit or loss may be expected to result from the execution of this program, and whether or not additional financing will be necessary."

Industrial Coal Reserves Drop To 29 Days' Supply

Stocks of anthracite and bituminous coal in the hands of industrial consumers in the United States and Canada on March 1 were 36,544,000 net tons, according to the monthly report of the National Association of Purchasing Agents, Inc. This figure is equal to 29 days' supply, based on the February consumption of 35,195,000 net tons. Stocks were being depleted during the month of March, and the association anticipates a marked decline in the total on hand by April 1. A further decline during April and May is expected, though to a much less degree than in preceding months.

Days' Supply of Bituminous Coal in Various U. S. Industries

Byproduct coke	26	Railroads	23
Electric utilities	41	Steel mills	26
Coal gas plants	54	Other industries	30
Average total bituminous stocks throughout the United States			28

Estimates of Output, Consumption and Stocks, in Net Tons

	United States Production	Industrial Consumption	On Hand in Industries
February, 1929	54,000,000	38,175,000	40,808,000
March	44,391,000	40,566,000	40,108,000
April	43,329,000	37,750,000	35,385,000
May	46,480,000	37,298,000	33,468,000
June	42,969,000	34,485,000	31,282,000
July	45,635,000	35,040,000	31,415,000
August	49,843,000	34,886,000	32,712,000
September	51,307,000	35,960,000	34,289,000
October	59,567,000	39,482,000	36,107,000
November	51,719,000	38,747,000	37,313,000
December	53,858,000	38,581,000	37,512,000
January, 1930	56,816,000	38,512,000	39,007,000
February	45,712,000	35,195,000	37,078,000
March 1	.....	.....	36,544,000

Anthracite Tariff Proposed

Representative Brumm, of Pennsylvania, announced on the floor of the House on March 18 that he will endeavor to have included in the present tariff bill a duty of $4 a ton on anthracite. Importations of anthracite from the Soviet, produced by convict and enforced labor, have increased considerably in the past year, he said. This product is produced, he stated, by men "working for 17c. a day, and at an actual loss to the government this product was shipped as ballast into American ports." Last year, Soviet coal, produced under these conditions, was sold in Philadelphia for $5 a ton and, he pointed out, the cheapest the Pennsylvania producers could offer it in the anthracite region was $10 a ton. Representative Brumm intends to offer his amendment in the house when the tariff bill is returned to that body from the Senate.

Bureau of Mines Approves Explosives

Three changes in the active list of permissible explosives were made by the U. S. Bureau of Mines in March. Details are given in the accompanying table. In the month of February, the Bureau granted Approval No. 3 to the Cardox blasting device, Model AA, under Schedule 20.

Changes in the List of Permissible Explosives During the Month of March*

	Vol. Poisonous Gases	Characteristic Ingredient	Weight of 1¼x8-In. Cartridge, Grams	Smallest Permissible Diameter, Inches	Unit Deflective Charge, Grams	Rate of Detonation in 1¼-In. Diameter Cartridge, Ft. per Sec.
[1]Austin Red Diamond A, L. F.	B	Ia	165	1¼	214	3,560
[2]Duobel No. 3, L. F.	B	Ia	110	1¼	227	3,060
[3]Genite C	C	Ia	104	1¼	226	2,590

*Class designations are fully explained in *Coal Age*, July, 1929, p. 430. [1]Austin Powder Co. [2]E. I. duPont de Nemours & Co. [3]General Explosives Corporation.

Coal Classification System Offered Standards Body

A tentative federal classification of coal, comprising nine gradations from peat to anthracite and beyond, was submitted to a subcommittee of the American Standards Association at a conference held in Washington, D. C., March 26. The committee viewed a comprehensive array of samples arranged according to the plan of Dr. M. R. Campbell, of the U. S. Geological Survey, who devised the system to follow scientific requirements and at the same time to be understandable by the average merchant or operator.

N.C.A. Meeting Scheduled

The thirteenth annual meeting of the National Coal Association will be held Oct. 15-17, inclusive, at the Book-Cadillac Hotel, Detroit, Mich., according to a decision of the annual meeting committee, which met in New York City, April 4, with Chas. A. Owen, president, Smokeless Coal Co., presiding. Plans for the program are under consideration and suggestions from bituminous operators will be welcomed.

Obituary

JOSIAH T. EVANS, vice-president of the Smokeless Coal Co. and director of the Citizens Coal Co., died at his home in Johnstown, Pa., March 22, at the age of 83. Mr. Evans also served as mine inspector for the Sixth Bituminous District of Pennsylvania for 24 years, retiring in 1928.

HARRY O. STAPLES, vice-president and treasurer of Staples & Bell, Inc., Scranton, Pa., died at his home in that city on March 13. Mr. Staples, who was born in Malden, Mass., in 1880, was active in the coal business for 23 years. When the Chance coal cleaner was brought out, he was made sole licensee for the anthracite region. In addition to his other activities, he was president of the Grand Tunnel Coal and Anthracite Transportation Co.; treasurer and director of the Roaring Brook Coal Co., and a trustee for the Rose Coal Co.

WILLIAM J. RODERICK, 45, president of the White Horse Coal Co., operating at Flemington, W. Va., died by his own hand in Cincinnati, Ohio, March 14.

GEORGE ROLLO, 75, superintendent of the Penwell Coal & Mining Co.'s mines at Pana, Ill., for 25 years, died at his home in that city on March 17, following a heart stroke.

JAMES H. COLLIER, 67, for the past 27 years secretary of the Buck Run Coal Co., and more recently vice-president, died at his home in Buck Run, Pa., April 1, after a short Illness. Mr. Collier was an authority on anthracite stripping and, in addition, was frequently called into discussion when mine fires occurred.

Noah H. Swayne, 2d

Former New York lawyer and adviser to the U. S. Fuel Administrator during the World War, has been made executive director of the Anthracite Institute, New York City. Mr. Swayne, now a resident of Philadelphia, Pa., is administrator of the Philadelphia Retail Coal Conference and president of the Coal Club of Philadelphia. He was at one time president of the American Wholesale Coal Association and, together with other affiliations, has had about thirty years of active experience in the coal industry. Mr. Swayne assumed direction of the Institute on April 1.

Colorado and New Mexico Adopt Trade-Practice Code

Authorized representatives of 92 per cent of the bituminous coal production in Colorado and New Mexico, at a meeting held in Denver, Colo., April 3, adopted a code of fair trade practices. The code is similar to the Utah code in many respects, which the Federal Trade Commission has already approved. The action taken at the Denver meeting is subject to the approval of the directorates of all the companies represented.

Foremen's Club Holds Banquet

More than 100 men attended the quarterly banquet of the Federal Mines Foremen's Club of the New England Fuel & Transportation Co., Grant Town, W. Va., which was held at the Elks' Home, Fairmont, W. Va., March 29. Michael P. Grady, Canton, Ohio, humorist, poet, and philosopher, was the principal speaker. Others on the program included D. L. Brown, general superintendent; Alex Grant, Mr. Brown's assistant; W. H. Forbes, safety engineer, and C. E. Yerkey, fireboss, Mine No. 1.

Foremen who had operated their departments or sections for over 150 days without a lost-time accident, were presented with a suitably engraved Eversharp pencil. These included: Fred Pitman, Orval Fluharty, T. W. Napples, J. V. Lemley, W. L. Straight, L. R. Cosner, Claude Fox, J. W. Almond, Harry Nichols, and Walter London.

Personal Notes

RALPH KNODE, president, Stonega Coke & Coal Co., Philadelphia, Pa., has been appointed a member of the executive committee of the National Coal Association, succeeding the late Otis Mouser.

A. F. MARSHALL, formerly with the American Coal Cleaning Corporation, Welch, W. Va., has been made general superintendent of the New River and Pocahontas division of the Consolidation Coal Co. Mr. Marshall will make his headquarters at Coalwood, W. Va.

W. J. HEATHERMAN, former chief of the West Virginia Department of Mines, has been made general superintendent of the Davis Coal & Land Co., operating in Randolph and Webster counties, West Virginia.

MILTON BRANDON, former superintendent at Graceton, Pa., has been made superintendent of the Vinton Colliery Co., Vintondale, Pa., vice Otto Hoffman, deceased.

Coming Meetings

American Mining Congress; annual Convention of Practical Coal Operating Men and National Exposition of Coal Mining Machinery and Equipment, May 5-10, at Cincinnati, Ohio, under auspices of Manufacturers' Division.

International Railway Fuel Association; annual meeting, May 6-9, at Hotel Sherman, Chicago, Ill.

Mine Inspectors' Institute of America; annual meeting, May 12-14, at Deshler-Wallick Hotel, Columbus, Ohio.

Western Canada Fuel Association; annual meeting, May 19-20, Hotel Saskatchewan, Regina, Sask., Canada.

Rocky Mountain Coal Mining Institute; summer meeting, May 26-28, Cosmopolitan Hotel, Denver, Colo.

National Retail Coal Merchants' Association; June 5-7, at Asbury Park, N. J.

Illinois Mining Institute; annual summer meeting, aboard the "Cape Girardeau," leaving St. Louis, Mo., June 6 at 10 p.m.

Indiana Coal Producers' Association; annual meeting, June 6, at Terre Haute, Ind.

Second World Power Conference; June 16-25, Berlin, Germany.

Colorado and New Mexico Coal Operators' Association; annual meeting, June 18, at Boston Building, Denver, Colo.

American Society for Testing Materials; annual meeting, June 23-27, at Haddon Hall, Atlantic City, N. J.

American Institute of Electrical Engineers; annual meeting, June 23-27, at Toronto, Canada.

Coal Division of the American Institute of Mining and Metallurgical Engineers, Sept. 11-13, at the William Penn Hotel, Pittsburgh, Pa.

International First-Aid and Mine Rescue Contest, Sept. 16-18 at Jefferson County Armory, Louisville, Ky.

National Safety Council; annual Safety Congress, Sept. 29 to Oct. 4, inclusive, at Pittsburgh, Pa.

Anthracite Section of National Institute Reorganizes at Hazleton Meeting

WITH 196 persons present, the Anthracite Section of the American Institute of Mining and Metallurgical Engineers was re-established, after a few years' lapse, in the course of a meeting held March 15 in Hazleton, Pa. Introduced by A. B. Jessup, vice-president and general manager, Jeddo-Highland Coal Co., Paul Sterling, mechanical engineer, Lehigh Valley Coal Co., Wilkes Barre, Pa., acted as chairman and declared that the section expected to hold three or more sessions annually.

The nominating committee's report was presented, the committee consisting of C. F. Huber, chairman of the board, Lehigh & Wilkes-Barre Coal Co., Wilkes-Barre, Pa.; W. W. Inglis, president, Glen Alden Coal Co., Scranton, Pa., and J. B. Warriner, president, Lehigh Navigation Coal Co., Lansford, Pa. The committee nominated Paul Sterling for chairman; Eli T. Conner, consulting engineer, Scranton, Pa., for vice-chairman; J. C. Haddock, president and general manager, Haddock Mining Co., Wilkes-Barre, Pa., for secretary-treasurer, with the following executive committee: J. C. Brydon, vice-president in charge of operations, Pittston Co.; G. B. Hadesty, consulting engineer, Pottsville, Pa.; Cadwallader Evans, Jr., general manager, Hudson Coal Co., Scranton, Pa.; E. H. Suender, vice-president and general manager, anthracite operations, Madeira, Hill & Co., Frackville, Pa.; A. B. Jessup, J. B. Warriner, C. F. Huber, J. M. Humphrey, president, Lehigh Valley Coal Co., Wilkes-Barre, Pa., and B. H. Stockett, general manager, Locust Mountain Coal Co. and Pine Hill Coal Co., Bethlehem, Pa. These nominees were unanimously elected.

Mr. Conner declared that engineering science in the United States largely had its origin in the anthracite region. The needs of the coal fields for canals and railroads gave birth to this development. True, it was not all native talent that was the basis of the progress. Some men were brought in from Great Britain for that purpose. But it was for the making of contact between the anthracite region and the coast cities that engineering science was first extensively evoked in this country. Another feature in that early progress was the study of combustion, to find means of burning a fuel that required a controlled draft.

Of the charter members of the A.I.M.E., but one remains, Dr. Drinker, a product of the anthracite region and the president of Lehigh University. Next to Dr. Drinker, W. S. Ayres, of Hazleton, is the member of the institute having the longest record of service. Yet there were only five members from the anthracite region during the last annual meeting and only three at the first meeting of the newly formed Coal Division.

Times demand more engineering skill, said Mr. Conner. The tide in favor of substitutes, as Mr. Jessup had said, in the end can be turned back only if better engineering reduces the costs and improves the quality of coal. From 1897 to 1900 there was, said Mr. Conner, a similar period of distress. He was running a small mine, producing coal for $1.14 and it was being sold at $1.04. The railroads were using the coal mines as pawns in their fight for domination.

A. B. Parsons, assistant secretary of the A.I.M.E., declared this Hazleton meeting was the largest sectional meeting he had ever attended. New York, with its 1,300 members, rarely brought forward more than 100, yet with only about 150 members in the anthracite region nearly 200 persons were present at the inauguration of the renovated section.

E. C. Weichel, assistant to the general manager, Hudson Coal Co., read an address in which he stated that the Schaefer lining in use at the Powderly mine, which was placed twenty months ago, through showing the expected signs of distortion, is still standing up well. Experiments have been made putting the rings 3 ft. apart instead of skin to skin with concrete, wood, or iron braces, concrete being preferred. Of these individual arches, 150 have been installed. A wood wedge at one end of the concrete brace, by its yielding to crushing stresses permits of some slight movement lengthwise of the gangway should such motion be needed to afford relief.

Mr. Weichel declared that the cost of Schaefer lining lay between that of ordinary and treated timber, and presented figures based on Schaefer rings or timbers set 3 ft. apart.

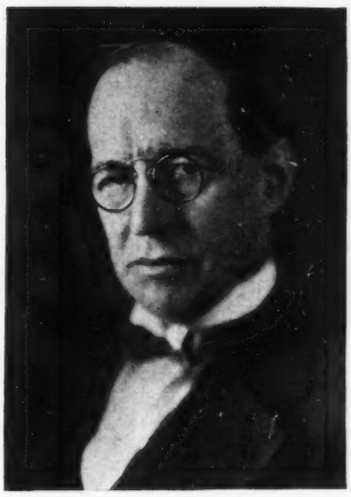
Relative Cost of Schaefer Lining and Timber Sets

Per Set	Schaefer Lining	Ordinary Timber	Treated Timber
Material	$10.29	$7.10	$17.75
Labor	4.48	2.75	2.75
Royalty	2.52	....	.....
Total per set	$17.29	$9.85	$20.50
Cost per yard	15.56	10.84	22.50

At Powderly, the cost of setting up a timber set was $2.75 only for the first timber erected. The second time one is placed the cost is $5.50.

In every instance the arch, said Mr. Weichel, should be well packed both at the sides and at the top, so as to distribute the burden and prevent rapid movement of the superincumbent mass. It was found that the arch deformed so little that it was not necessary to make the roadway any wider than 9 ft. 8 in. in the clear. Recently the arches had been erected as fast as the faces advanced, the roof being held by forepoling. Much work could be saved by holding the roof, thus reducing the filling needed back of the arch.

Lane W. Hildreth, of the Anthracite Service, followed with an address on the progress of the selling campaign of the anthracite industry, and Mr. Sterling closed with the suggestion that names of members suitable for membership be furnished for a drive to begin May 1.



Daniel T. Pierce

Vice-chairman of the Anthracite Operators' Conference since early in 1926, has resigned coincident with the absorption of the organization into the Anthracite Institute. Mr. Pierce, a lawyer and publicist, was editor of "Public Opinion" from 1895 to 1905 and, prior to going with the Anthracite Operators' organization, contributed articles on political, sociological, and railway subjects to newspapers and magazines.

Senate Defeats Oil Tariff

A proposal for a tariff on oil was defeated by the Senate for the sixth time on March 22 by a vote of 45 to 33. The original proposal called for a duty of $1 per barrel, and the final proposal provided for a duty of 10 per cent of the origin price on raw or unmanufactured crudes, and 20 per cent on manufactured or partly manufactured products. The Senate did, however, adopt an amendment which directs the Tariff Commission to make a study of the relative costs of American and Venezuela crude as delivered to American refineries on the Atlantic seaboard and report thereon in eight months.

Wirt Franklin, president, Independent Petroleum Association, announced that plans "are being drawn for continuing the fight when the next Congress convenes." He also announced that he would immediately call a meeting of the industry to perfect an organization to carry on an educational campaign as to the advantages of an oil tariff.

Gas Sales Increase

Figures released by the American Gas Association show that gas sold in the New England states for house-heating purposes increased 57.7 per cent in 1929, as compared to 1928. In the states of Illinois, Michigan and Wisconsin, increases of 28.5, 57.8 and 59.6 per cent, respectively, were shown over the 1928 sales.

Rate Differential Proposed For Kentucky Coal

Establishment of a differential of 35c. per net ton on western Kentucky coal over southern Illinois coal, and maintenance of the differential where it already exists, are proposed by examiner W. A. Hill, of the Interstate Commerce Commission, in the case of the *West Kentucky Coal Bureau vs. Illinois Central et al.* His recommendations are as follows:

"The Commission should find that, except as noted, the rates assailed are not unreasonable and that the relationship between such rates, on the one hand, and the interstate rates on coal, in carloads, from mines in Illinois and Indiana, on the other, is not unduly prejudicial. It should find further that the relationship between the rates assailed to destinations in Illinois from western Kentucky, on the one hand, and the intrastate rates from mines in Illinois, on the other, is unduly prejudicial to complainant's members and unduly preferential of their competitors in Illinois to the extent that the said rates from western Kentucky exceed by more than 35c. per net ton the rates contemporaneously in effect from mines in southern Illinois to the same destinations.

"It should find further that the combination rates assailed from western Kentucky to destinations in the states above named are unreasonable, unduly prejudicial to complainant's members, and unduly preferential of their competitors in Illinois and Indiana, to the extent that they exceed by more than 35c. per net ton the rates contemporaneously in effect from mines in southern Illinois on lines other than the Louisville & Nashville."

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Illinois Blast Kills Three

An explosion of gas March 18 in the Valier Coal Co. mine, at Valier, Ill., resulted in the death of three miners. Three others were seriously injured and four were slightly burned. Reports indicate that the cause of the ignition was a spark from a trolley locomotive.

Disposal of Anthracite Holdings Ordered by Commission

The Temple Anthracite Coal Co., Scranton, Pa., has been ordered to divest itself, within 90 days from day of service of the order, of all its holdings and interest in the Temple Coal Co., Scranton, Pa., such divestment to carry with it all the property and assets of the Temple company, or, within the same time limit, to divest itself of all its holdings and interests in the capital stock of the East Bear Ridge Colliery Co., Scranton, Pa., such divestment to carry with it all the property and assets of the East Bear Ridge concern. The order, promulgated by the Federal Trade Commission, is based on Section 7 of the Clayton Act, prohibiting acquisition of stock in a competing company.

Prior to the Temple Anthracite company's acquisition of the stock of the Temple Coal Co. and the East Bear Ridge Colliery Co., the two were competitors and the Commission held that this acquisition of stocks and their use substantially lessened competition in interstate commerce between them.

King Coal's Calendar for March

March 1—Lehigh Navigation Coal Co. comes into being with the purchase of all the coal-mining and marketing properties, coal accounts receivable, and real and personal property of the Lehigh Coal & Navigation Co.

March 7—Ten men are killed and eleven injured in a gas explosion in the Caziers mine, Marionville, Belgium.

March 8—Five men killed in an explosion of gas in the new mine of the Peerless Coal Co., Price Canyon, Utah. Ignition is thought to have been caused by a spark from a mining machine.

March 10—Two men are killed and 87 escape from the Wolf Run mine of the Warner Collieries Co., near Amsterdam, Ohio, after a fire caused by sparks from a loaded car jumping the track.

March 10—Thirty-first constitutional convention of the United Mine Workers opens at Indianapolis, Ind. One thousand delegates ratify the action, taken as a result of a referendum in 1928, dispensing with an international convention in 1929.

March 10—Insurgent members of the United Mine Workers open convention at Springfield, Ill., under the auspices of District 12, comprising the State of Illinois, "to establish an international organization of the United Mine Workers of America; to adopt an international constitution that will place control of the organization in the hands of the rank and file; to elect international officers, and to adopt ways and means to accomplish the complete reorganization of the United Mine Workers of America." Alexander Howat, of Kansas, is elected chairman of the convention, delegates rejecting Harry Fishwick, president of the Illinois miners' organization. The first article of the constitution adopted stated that "this organization shall be known as the United Mine Workers of America." The convention then declared vacant all the offices of the international union.

March 11—British Labor Government defeated in a vote on a Conservative amendment to the Coal Mines Bill by a vote of 282 to 274. The successful amendment, on which the government was defeated, was to remove from the bill the provision for a levy on domestic coal to foster the export trade, and marked the first defeat of the Labor party in its program of coal-mine legislation.

March 11—Delegates to the insurgent United Mine Workers' convention amend their newly adopted constitution to include a demand for a five-day week in addition to a clause calling for six-hour day "from bank to bank."

March 12—Delegates to the 31st constitutional convention of the United Mine Workers go on record as favoring the passage of a Senate bill providing for licensing of bituminous coal operators and regulation of mine operation. This is the first time in history that a miners' convention has advocated such legislation.

March 12—Senate Labor Committee asked by the insurgent United Mine Workers' convention to aid the cause of reorganization.

March 14—Western Pennsylvania Coal Traffic Bureau and Ohio Lake Cargo Coal Rate Committee file complaints attacking rates on coal shipments to the lakes, alleging that they are in violation of section 3 of the Interstate Commerce Act, and therefore unduly prejudicial and disadvantageous to the complainants and preferential to the Southern coal-producing districts.

March 15—Alexander Howat, Kansas; Adolph Germer, Illinois, and J. H. Walker, president, Illinois Federation of Labor, elected president, vice-president, and secretary-treasurer, respectively, of the United Mine Workers by delegates to the insurgent convention at Springfield, Ill. The convention closed with an appeal to William Green, president, American Federation of Labor, for aid in laying a peace proposal before the Indianapolis convention.

March 17—William Green, president, pledges the support of the American Federation of Labor to the regular organization of the United Mine Workers in its fight against the insurgent group organized at the Springfield convention.

March 17—Senate restores countervailing duty on coal, stricken out of the tariff bill by Senator Smoot at the request of the State Department.

March 18—Gas explosion in the mine of the Valier Coal Co., Valier, Ill., kills three men. Three others were seriously injured and four were slightly burned. Reports indicate that the cause of the ignition was a spark from a trolley locomotive.

March 18—Delegates to the United Mine Workers' convention at Indianapolis, Ind., amend constitution to grant supreme power to the executive committee. The convention also gave the international president power to revoke charters of subordinate unions, subject to review by the executive committee, and to set up provisional governments where charters were revoked.

March 20—MacDonald government defeats an amendment to the Coal Mines Bill, removing the provision for the setting up of district committees to fix minimum prices at which British coal may be sold, by a vote of 274 to 229. The Liberals abstained from voting.

March 20—Scale committee of the United Mine Workers, reporting at the convention held in Indianapolis, Ind., recommends that "every effort be made to have all contracts in the bituminous region expire on the same date, and to that end every effort should be made to have the contracts about to be negotiated expire April 1, 1932," thus in effect reconstituting the old Central Competitive Field.

March 24—Gas explosion in the Lytle mine of Lytle Colliery Co., near Minersville, Pa., kills one man and injures four others. A previous accident on the same level on Feb. 25 caused the death of four men.

March 26—Twelve miners killed in an explosion in the Yukon mine of the Crown Coal Co., near Arnettsville, W. Va. The cause of the blast is said to have been the ignition of a gas pocket by a spark from a locomotive.

March 26—Revoking the charter of District 14 (Kansas), John L. Lewis, president, United Mine Workers of America, appoints Henry Allai and Joseph E. Promek provisional president and provisional secretary, respectively. Provisional officers were directed to return to the district immediately and take charge of the union affairs. This action automatically deposes the followers of Alexander Howat, who state that they will refuse to hand the records over to the provisional officers.

March 29—Sixteen men killed in an explosion in the mine of the Pioneer Coal Co., Kettle Island, Ky. Four hundred men are ordinarily employed at the operation, only a small proportion of whom were in the mine at the time of the blast.

Business in General Shows Upward Trend At End of First Quarter

By Robert M. Davis
Statistical Editor
McGraw-Hill Publishing Co.

AFTER an extended period of uncertainty, there are many indications that the close of the first quarter of the year finds general business and industry definitely on the upward trend. Materially increased general construction contracts awarded in practically all sections of the country during the past few weeks, easing of money rates, improvement in the prices of farm staples, and trade and industrial betterment in one way or another in practically all sections of the country serve to give the brightest outlook since the year opened. In spite of the undoubted prevalence of unemployment in most of the industrial centers the sum total of industrial activity at the close of the first quarter as reflected by the various indexes available is not really poor, suffering chiefly by comparison with the particularly great activity in the fore part of last year. No small part of the current unemployment is technological in nature, brought about by increasing efficiency in production in the last few years, and thus not wholly eliminated by a mere increase in industrial production. Not enough new commodities and forms of service have been brought out to take up the slack produced by increasing efficiency.

"Current business is only fair and collections are slow, but both are decidedly more favorable than we thought possible last November, and we fully expect a material improvement as the spring opens up." Such is the composite view of the country's business and industrial men as obtained by the writer during a 17,000-mile tour just completed which covered every section of the United States. The business men recognize the fact that the wave of fear and apprehension which swept across the country immediately following the collapse of the stock market last October might easily have quickly led to chaos and temporary destruction of the country's economic structure had it not been for the recuperative measures adopted by the financial and business interests under the direction and call of the federal authorities at Washington. Having been saved from this plunge into the abyss, the American business man is psychologically inclined to regard the present fair condition of production and trade as in a measure satisfactory. At any rate, there is very little pessimism among business men as to the future—once the spring trade demands get under way.

The general business and industrial outlook for the second quarter as well as for the remainder of 1930 is distinctly favorable. With most of the industrial groups, including general construction, now definitely on the upgrade, and general trade expanding with the unusually late spring demands, there is a rosy hue to the horizon which has not existed since the recession set in last fall. Omitting the first quarter of the year, which was definitely one of adjustment to an entirely different economic plane, the year 1930 should stand out as one of unusual stability in American trade and industry. The last three quarters should witness an almost continuously improving state of business and industrial operations; in fact, the closing months of 1930 should witness the opening of a period of business and industrial operations which will rival any period of prosperity which this country has known heretofore.

Earnings and Employment Decrease in January

Employment in coal mining—anthracite and bituminous combined—showed a decrease of 1 per cent in January, 1930, as compared to December, 1929, and payroll totals were lower by 13.9 per cent, according to the monthly *Labor Review* of the U. S. Department of Labor. The pronounced decrease in earnings in January was due to the observance of holidays, some church celebrations, and market conditions during the period covered by the payrolls reported. The 1,449 mines reporting had in January 333,081 employees, whose combined earnings in one week were $9,069,079. In anthracite mining in January there was a decrease of 4.7 per cent in employment and a decrease of 22.9 per cent in payroll totals.

Employment in bituminous coal mining increased 1.1 per cent in January, 1930, as compared to December, 1929, while payroll totals decreased 6.3 per cent, as shown by reports from 1,287 mines in which there were in January 217,371 employees, whose combined earnings in one week were $5,378,585. Substantial increases in employment were shown in each geographic division, with the exception of the East North Central, but decreases in earnings were general.

Countervailing Duty Restored

Following a determined effort by the Senators from the various coal-producing states and the industry at large, the Senate on March 17 restored the clause in the tariff bill providing for a countervailing duty on coal. The countervailing duty was stricken out some time ago by Senator Smoot at the request of the State Department, on the ground that it violated existing treaties. Representatives of the industry pointed out that repeal of the duty would subject New England and other Northern states to a flood of Canadian coal.

Alberta Mines Want Subsidy

Operators in the province of Alberta (Canada) producing steam coal have asked the Dominion government for assistance in marketing their output in Manitoba, where they hope to obtain a portion of the trade which now goes to the United States. A subvention, based on freight rates east of the Manitoba boundary, of one-fifth of a cent per ten miles is requested, with the concessions granted the Nova Scotia operators offered as a precedent.

Employment and Payrolls in Identical Bituminous Coal Mines in December, 1929, and January, 1930

	Mines	Number on Payroll			Amount of Payroll		
		Dec., 1929	Jan., 1930	Per Cent Change	Dec., 1929	Jan., 1930	Per Cent Change
Middle Atlantic	400	62,884	63,690	+ 1.3	$1,622,358	$1,502,134	— 7.4
East North Central	166	31,046	30,921	— 0.4	915,445	815,387	—10.9
West North Central	57	6,166	6,427	+ 4.2	171,113	161,122	— 5.8
South Atlantic	306	50,590	50,878	+ 0.6	1,332,051	1,241,568	— 6.1
East South Central	206	42,875	43,320	+ 1.0	946,848	936,681	— 1.1
West South Central	33	2,941	3,047	+ 3.6	82,185	81,284	— 1.1
Mountain	110	17,023	17,645	+ 3.7	628,220	590,779	— 6.0
Pacific	9	1,422	1,443	+ 1.5	54,315	49,630	— 8.6
All divisions	1,287	214,947	217,371	+ 1.1	$5,742,535	$5,378,585	— 6.3

Per Cent Change in Each Line of Employment, December, 1929, and January, 1930

	Establishments	Employment			Payroll in One Week		
		Dec., 1929	Jan., 1930	Per Cent Change	Dec., 1929	Jan., 1930	Per Cent Change
Manufacturing	12,321	3,239,353	3,197,153	— 1.8[1]	$85,780,919	$82,113,074	— 4.8[1]
Coal mining	1,449	336,338	333,081	— 1.0	10,528,091	9,069,079	—13.9
Anthracite	162	121,391	115,710	— 4.7	4,785,556	3,690,494	—22.9
Bituminous	1,287	214,947	217,371	+ 1.1	5,742,535	5,378,585	— 6.3
Metalliferous mining	350	61,546	59,837	— 2.8	1,876,333	1,745,910	— 7.0
Quarrying and non-metallic mining	586	31,258	27,591	—11.7	765,895	645,047	—15.8
Public utilities	9,657	721,781	711,996	— 1.4	21,773,012	21,308,623	— 2.1
Trade	8,295	354,885	289,855	—18.3	8,602,270	7,353,547	—14.5
Wholesale	1,757	60,571	59,052	— 2.5	1,887,832	1,802,907	— 4.5
Retail	6,538	294,314	230,803	—21.6	6,714,438	5,550,640	—17.3
Hotels	1,706	150,949	155,209	+ 2.8	2,586,835[2]	2,264,153[2]	+ 1.4
Canning and preserving	403	23,862	17,947	—24.8	435,903	345,749	—20.7
Total	34,857	4,919,972	4,792,669	— 2.6	$132,349,158	$125,205,182	— 5.4

[1]Weighted per cent of change for the combined 54 manufacturing industries; remaining per cents of change, including total, are unweighted. [2]Cash payments only.

Coal-Mine Fatality Rate Greater in February Than in the Same Month Last Year

ACCIDENTS at coal mines in the United States during February, 1930, caused the death of 160 men, according to reports received from state mine inspectors by the U. S. Bureau of Mines. Of the 160 deaths reported, 124 occurred in bituminous mines in various states and the remaining 36 were in the anthracite mines of Pennsylvania. During the month, 45,712,000 tons of coal was mined, of which 39,555,000 tons was bituminous and 6,157,000 tons was anthracite. Fatality rates per million tons, based on these figures, were 3.13 and 5.85, respectively, for bituminous and anthracite mines, while the industry as a whole showed a death rate of 3.50.

The record for February, 1929, showed 183 deaths, 140 occurring in bituminous mines and 43 in anthracite mines, with a production of 47,900,000 tons of bituminous coal and 6,670,000 tons of anthracite, or a total of 54,570,000 tons. Fatality rates based on these figures were 2.92, 6.45, and 3.35, respectively. Thus it will be seen that while there has been a decrease in both the number of fatalities and the production of coal during the present month as compared with February a year ago, it is in such proportion as to show a slight increase in the fatality rate for bituminous mines and for the industry as a whole, although the rate for anthracite mines was reduced. The death rates for February, 1930, showed an improvement over those for the preceding month of January for the industry as a whole, and also for bituminous and anthracite, separately. The January rates were 3.85 for all coal mines, 3.42 for bituminous mines and 6.96 for anthracite mines.

Reports for the first two months of 1930 show that accidents at coal mines caused the loss of 379 lives. The production of coal during this period was 102,528,000 tons, with a death rate of 3.70, as compared with 3.23 for the same two months of 1929, based on 368 deaths and 114,047,000 tons of coal. Divided into bituminous and anthracite, the fatality rates for 1930 were 3.29 and 6.44, based on 294 deaths and 89,333,000 tons for bituminous mines and 85 deaths and 13,195,000 tons for anthracite mines.

One major disaster—that is, one in which 5 or more lives were lost—occurred during February, 1930. This was an explosion at Standardville, Utah, on Feb. 6, which caused the death of 20 men. This explosion brought the number of such disasters to 3, with a resulting loss of 35 lives for the first two months of 1930. There were no major disasters in February, 1929, but there was one in January of last year which caused 14 deaths.

A comparison of the accident record for the first two months of 1930 with that for the same period of 1929, shows a reduction in the death rates for haulage and explosives, while increases are shown for falls of roof and coal, gas or dust explosions, and electricity. The comparative rates are as follows:

	1929	Jan.-Feb., 1929	Jan.-Feb., 1930
All causes	3.581	3.227	3.697
Falls of roof and coal	1.934	1.640	1.990
Haulage	0.675	0.736	0.546
Gas or dust explosions:			
Local explosions	0.082	0.114	0.185
Major explosions	0.238	0.123	0.342
Explosives	0.145	0.193	0.146
Electricity	0.133	0.088	0.156
Miscellaneous	0.374	0.333	0.332

Bituminous Companies Insure Employees

Group life insurance totaling $690,000 has been taken out for the employees of four coal-mining companies in the bituminous coal fields. The operating companies and the amounts of group insurance, underwritten by the Metropolitan Life Insurance Co., New York City, are as follows: Sonman Shaft Coal Co. and Sonman Store Co., Inc., Portage, Pa., $425,000; American Export Corporation, Mt. Lookout, W. Va., $150,000; Amigo Coal Co., Amigo, W. Va., and J. A. Wood Coal Co., Raleigh, W. Va., $115,000. With the exception of the Sonman company, all the policies are on the co-operative plan, employees and employer each paying half of the premiums.

Coal Mine Fatalities During February, 1930, by Causes and States

(Compiled by Bureau of Mines and published by *Coal Age*)

State	Underground												Shaft					Surface							Total by States	
	Falls of roof (coal, rock, etc.)	Falls of face or pillar coal	Mine cars and locomotives	Explosions of gas or coal dust	Explosives	Suffocation from mine gases	Electricity	Animals	Mining Machines	Mine fires (burned, suffocated, etc.)	Other causes	Total	Falling down shafts or slopes	Objects falling down shafts or slopes	Cage, skip or bucket	Other causes	Total	Mine cars and mine locomotives	Electricity	Machinery	Boiler explosions or bursting steam pipe	Railway cars and locomotives	Other causes	Total	1930	1929
Alabama	4								1			5													5	4
Alaska																										0
Arkansas				2								2													2	1
Colorado	1	1										2													2	9
Illinois	4		1				1					6													6	11
Indiana	3											3													3	3
Iowa	1										1	2													2	1
Kansas	1			1								2													2	2
Kentucky	8		4				3					15													15	16
Maryland	1											1													1	2
Michigan																									0	0
Missouri	2											2													2	1
Montana			1									1													1	0
New Mexico																									0	1
North Dakota																									0	0
Ohio	3		1									4													4	8
Oklahoma																									0	2
Pennsylvania (bituminous)	17		2				2		1		2	24													24	30
South Dakota																									0	0
Tennessee	3											3													3	0
Texas																									0	1
Utah	3		1	20								24						1						1	25	8
Virginia	1											1													1	1
Washington																									0	1
West Virginia	16	4	3				1		1			25	1				1								26	33
Wyoming																									0	5
Total (bituminous)	68	5	13	23			7		3		3	122	1				1	1						1	124	140
Pennsylvania (anthracite)	10	3	3	11	4	1	1				1	34			1		1					1		1	36	43
Total, February, 1930	78	8	16	34	4	1	8		3		4	156	1		1		2	1		1		1		2	160	
Total, February, 1929	86	13	43	5	12		3		1		3	166	1	2	1		4	4				2	6	13		183

OPERATING IDEAS

From PRODUCTION, ELECTRICAL

And MECHANICAL MEN

Timing Contactor Added to Limiter Circuit Prevents Unnecessary Power Interruptions

WHEN a two-stage power-demand limiter was installed by the Gauley Mountain Coal Co., Ansted, W. Va., it involved the problem of preventing interruption on an outside trolley circuit at those times when the limiter would attempt to open the circuit so late in the 15-minute period that the interruption would be unnecessary. These undesirable interruptions are prevented by a synchronous-motor-driven contact drum which makes one revolution in 15 minutes in synchronism with the power company's demand meter and also with the coal company's limiter.

Before the limiter was installed, monthly demands ran as high as 720 kw. The first stage of the limiter is adjusted to open a circuit when the demand reaches 500 kw. and the second stage to open another circuit when the demand mounts to 560 kw. As indicated by Fig. 1, this last stage opens all d.c. feeders, thus practically limiting the monthly demands to 560 kw. This reduces the demand portion of the power bill $240 per month compared with the billing of $1,080 for the former peak of 720 kw.

The first stage, which opens at 500 kw., interrupts the control circuit to a water-supply pump, to the feeder motor of a coal crusher, and to a reclosing circuit breaker which feeds the outside trolley system, including a two-mile outside main haul. No inconvenience is caused by stopping the pump and crusher at any time. To forestall opening of the outside-trolley breaker unless the time is right with respect to the end of the 15-minute interval, a clock-driven contact drum is connected to hold closed a circuit which shunts the contact of control relay *A*.

Fig. 2 shows the clock-driven contact drum. It was made by mounting a drum and contact on the works of a synchronous clock and fastening the whole in a voltmeter case. The drum is so built that the circuit is open for the first 13½ minutes of the period and closed for the last 1½ minutes.

To explain this proportioning, assume that a demand of 500 kw. is reached at the end of the fourteenth minute. What maximum average demand for the remaining minute could be tolerated so that the limit of 560 would not be reached? The answer is 900 kw., an unlikely average; therefore, suffering the effect of opening the outside-trolley breaker at that late a time in the period is almost certain to be futile.

To arrive at the figure of 900 requires an understanding that in reality the demand meter only totals the kilowatt-hours used in 15 minutes. A demand of 560 kw. means an average consumption of 9 1/3 kw.-hr. per minute, or a total consumption of 140 kw.-hr. in the 15-minute period. Four times that equals 560 kw.-hr. per hour or an average demand of 560 kw.

If in the remaining one minute the demand is to mount from 500 kw. up to 560 kw., or increase by 60 kw., then 15 kw.-hr. must be used in that minute. This would be the case if the demand averaged 900 kw. for the remaining period.

If the 500 kw. limit is reached in 13 minutes, an average demand of but 450 kw. for the remaining two minutes would bring the 15-minute demand to the 560 limit. It is quite likely that the figure of 450 would be exceeded; therefore, it is evident that the beginning of the short-circuiting segment of the contact drum should be somewhere between the thirteenth and fourteenth minute. The exact place cannot be calculated because the demand during the remaining period is an uncertain value. The 13½-minute point was arbi-

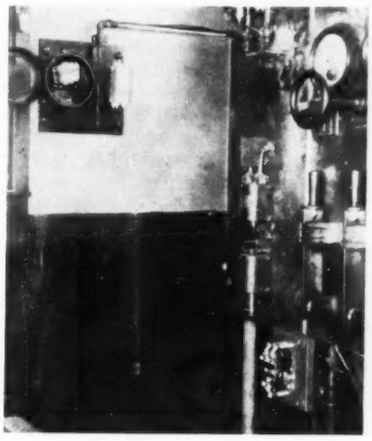
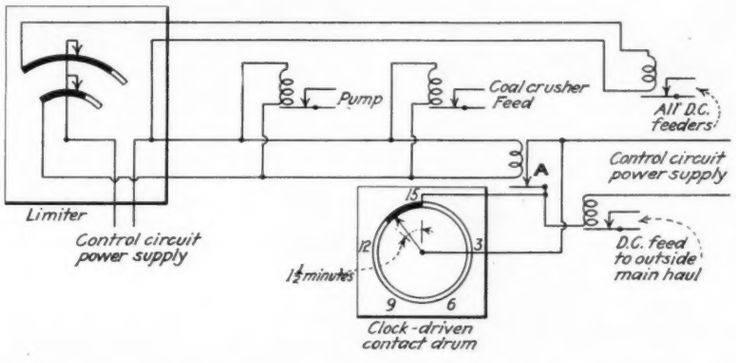


Fig. 2—Keeps the Limiter Within Bounds

Fig. 1—Conventional Sketch Showing Relation of Contact Drum to the Limiter Control Circuits



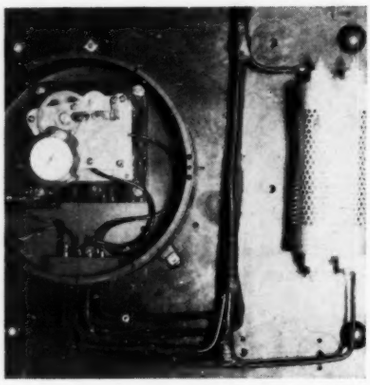


Fig. 3—Clock-Driven Contact Drum at Upper Left and Breaker Control Relay at Bottom Right

trarily selected, and appears satisfactory for the present load conditions.

G. E. Hoover, chief engineer, is the one who proposed adding to the limiter installation a device for preventing the interruption unless sufficient time remained to make it worth while. W. I. Dalton, chief electrician, worked out the electrical details.

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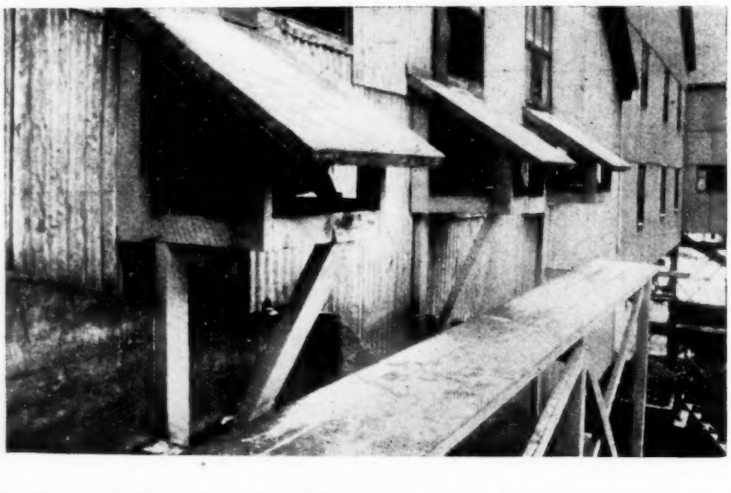
Outside Location Improved Motor Performance

Trouble with three 5-hp. motors driving vibrating screens in the tipple at the Keystone mine, in McDowell County, W. Va., was minimized and possibly eliminated entirely by moving the motors out of the building and installing them on platforms fastened to the wall outside. Less dust, better ventilation, and convenience for inspection are advantages brought about by the change of location.

Because of limited available floor space the motors originally were installed on the inside wall and close to the roof. Being of the open type, these motors became filled with coal dust, which together with the hot location close to the metal roof and difficulty in making inspections, caused the trouble.

The new arrangement includes a runway outside the building for oiling and inspection. The weatherproof covers are set in notches so that they can be lifted off and laid to one side during motor inspections. The belts operate through square holes in the side of the building.

Removable Covers and a Walkway Promote Lubrication and Inspection of Motors



Page Mr. Fixit!

Is there a Mr. Fixit at your plant? In times of operating distress, when the works stop precipitately, because of a major breakdown, or when one branch of operation ceases for the need of a minor adjustment to a piece of equipment, Mr. Fixit is the most valuable man on the property. Rolling up his sleeves, he tackles the job, cuts minutes from the delay and saves dollars for the company. How does he do it? With knowledge — knowledge gained from experience, from study of these pages. Mr. Fixit, you are invited to contribute your new ideas to this department. Sketches or photographs will help to "put them over." Each idea accepted for publication is paid for at a rate of $5 or more.

Bar Along Top Holds Car In Rotary Dump

When a rotary dump was installed at Peerless No. 1 mine of the Peerless Coal & Coke Co., Vivian, W. Va., trouble was encountered because of a wide variation in car dimensions. But the dump was successfully adapted to

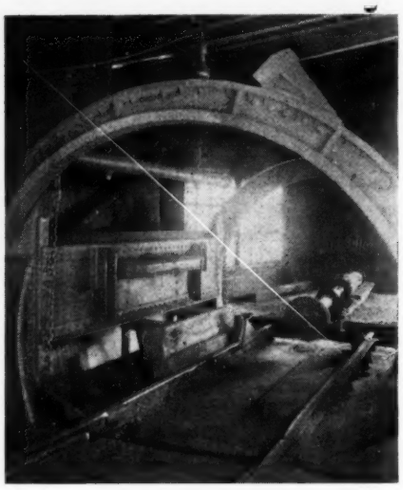


Fig. 1—The Chain and Pipe Are at One Side

the condition by adding a device to engage the top of the car with sufficient force to prevent derailment.

The arrangement consists of a piece of 4-in. pipe slightly longer than the car body and supported by chains kept under tension by counterweights. The pipe is held down in a normal position by other

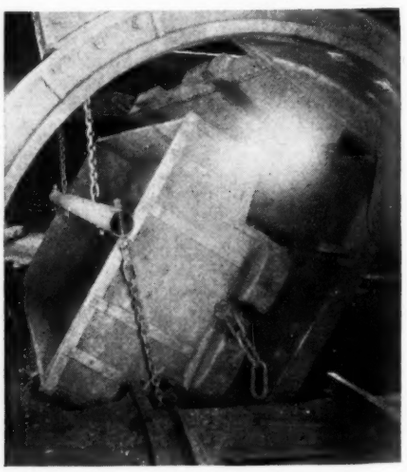


Fig. 2—At This Angle the Pipe Engages the Car

chains, one at each end, which are anchored to the dump frame at points level with the top of the rail. As indicated by Fig. 1, when the dump is normal the lower chains and the pipe are far enough to one side to clear the cars.

Fig. 2 shows that the pipe has engaged the car when the dump has

rotated about 60 deg. As the movement continues to the lower limit, the pipe is carried downward and the counterweights which are attached to the other ends of the upper chains are raised. These weights are sufficient to bring the car back as the dump returns.

Beside the left-hand rail, Fig. 1, are plates to engage the wheel sides and hubs to help hold the car in place until the pipe comes into play. This same illustration shows an air cylinder and plunger which kicks the empty car back out of the dump.

Motor Windings Dried by Hot Compressed Air

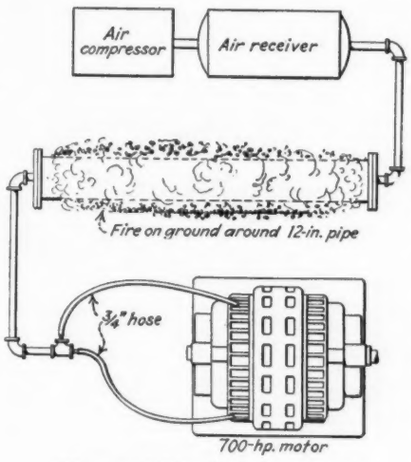
Maximum speed in drying a motor that has been flooded requires application of the highest heat which the insulation will stand, and a rapid change of air. These two conditions were effectively maintained by a simple arrangement during the early-stage drying of a 700-hp. 2,300-volt hoist motor at Bessie mine of the Sloss-Sheffield Steel & Iron Co., Maben, Ala. A. F. Elliott, general master mechanic and chief electrician of the company, has supplied the details.

On Nov. 28 an unusually high stage of water in the river flooded the hoist house and the a.c. substation. The water stood 4 ft. deep on the engine-room floor, submerging the main hoist motor and the 14-panel switchboard with the various contactor controls. The outdoor transformers, one a 1,500-kva., 44,000/2,300-volt unit and the other a 600-kva., 44,000/6,900-volt unit, both three-phase, were nearly half-submerged.

The mine was not affected—that is, the water did not reach the slope portal—so the first problem was to make power available to the main ventilating fan and underground pumps. This was accomplished by running lines direct from the transformer terminals to the overhead lines, cutting out entirely the hoist-house switching apparatus. Rowboats were used by the electricians when stringing these lines, and until the flood receded, the transformers operated by a combination of air-cooling and water-cooling.

In the meantime, plans were made for drying the electrical equipment. As soon as it was out of the water it was washed with a hose to remove the deposit of silt. The windings of the 700-hp. slip-ring motor showed zero insulation resistance, of course, when tested with a Megger. The first stage of drying was effected by directing blasts of hot air around the windings.

For furnishing the air, a 150-cu.ft. compressor was available. As indicated by the accompanying sketch, heating was accomplished by passing the air through a 10-ft. length of 12-in. pipe surrounded by an open fire. The air was directed into the windings at 20-lb.



Heat and Ventilation in One

pressure from two nozzles on ¾-in. hose. By keeping the 12-in. pipe at a red heat, the air blast was maintained at about 200 deg. F.

After 20 hours the Megger indicated a degree of insulation resistance warranting a change to drying by electric current. This was applied at 440 volts and the rotor was alternately blocked to provide overload current for internal heating and then allowed to run free for a time to induce ventilation. After ten hours of this treatment, the insulation showed a resistance of 7 to 8 megohms and the motor was ready for service.

Control magnets, overload trip coils, and other auxiliary apparatus had been removed and dried in a gas-heated bake oven. The oil switches were taken down, cleaned, and filled with dry oil.

Open wiring for power and control lines was used temporarily from motors to switchboard in place of the conduit wiring. After the old wiring had been removed, the conduits were swabbed out. The drying preparatory to installing new wiring was done by blowing heated air through the conduits. This air was supplied by the same equipment that was used in preliminary drying of the motor.

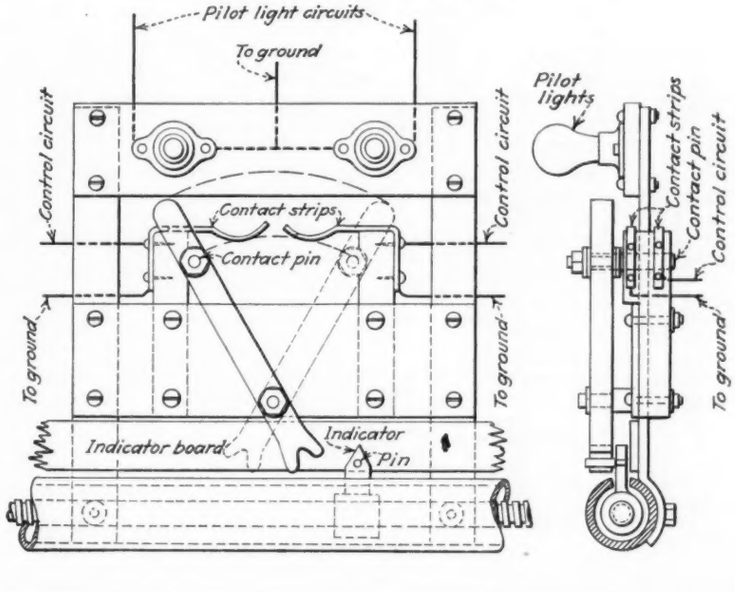
Automatic Track Switch on Rope Haulage Derails Runaway Cars

ONE of the greatest dangers in slope haulage is the constant possibility of a complete trip or a portion of a trip running away. When a rope breaks or a coupling gives way, men are exposed to injury and property to damage. A multitude of derailing devices have been developed against the occurrence of such accidents, but too many of them, unfortunately, rely upon manual control and are not positive.

On the slope joining the mine and the tipple at the No. 3 plant of the Northwestern Improvement Co., Roslyn, Wash., is installed an automatic electrically operated derailing switch which is said to have been thoroughly tried and proved successful. The details here provided have been taken from U. S. Bureau of Mines Information Circular No. 6226, prepared by S. H. Ash and Rudolph H. Kudlich.

This slope is 3,000 ft. long, about two-thirds of its length being underground, and the inclination to the horizontal is 4 to 8 deg. The derailer is placed a short distance above the bottom or tipple landing. Trips of 30 cars are lowered over the track by rope to an electric hoist which is located

Fig. 1—Design of Controller



underground at the head of the slope.

A controller (see Fig. 1) actuated by the hoist indicator operates an electro-hydraulic device at the switch and thus governs the derailer. Pilot lights at the hoist, tipple and along the slope indicate the position of the switch at all times. These lights are controlled by a switch linked to the track-switch bridle. They show red when the track switch is set for the derail and green when it is set for the tipple. The general layout is shown in the diagrammatic sketch presented as Fig. 2. When a trip reaches a point 300 ft. above the tipple, the switch is opened or closed by the functioning of the control system.

The controller consists of a double throw switch actuated through a pin-and-jaw device by the hoist indicator pointer, which makes or breaks the control circuit. A pin on the hoist indicator pointer engages the forked end of the contactor arm and causes the upper end of the arm to move to the right or to the left, depending on whether the trip is approaching or leaving the tipple. One or the other of the two control circuits is completed by the bridging of contact strips by a contact pin mounted on, but insulated from, the upper end of the arm. These two circuits operate the reversing switch.

Near the track switch is installed the reversing switch, a three-pole double throw type (with a no-voltage release) operated by solenoids, which governs the direction of rotation of a pump motor in the track-switch mechanism. The pump controls the direction of movement of a hydraulic cylinder piston and in turn the movement of the track switch. Oil is the hydraulic medium. The pump, cylinder, and piping are immersed in oil in a tank. By being connected through relief valves (Fig. 3) on the operating mechanism, the no-voltage release coils function in the manner of limit switches.

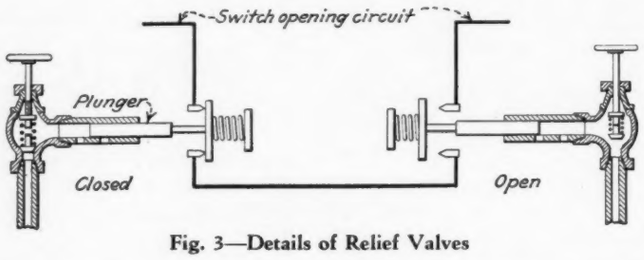


Fig. 3—Details of Relief Valves

These relief valves are spring-loaded to a pressure sufficient to break the points of the track switch loose, after standing overnight, without overtaxing the pump motor or the mechanism. This pressure limit was determined by a thrust of 300 lb. at the switch points. "When the switch points reach their limit of travel, pressure in the working end of the cylinder increases, the relief valve at that end opens, and the escaping oil forces out a plunger in the discharge pipe. The plunger is held in its normal position by a high spring which exerts just enough pressure to make good contact between an insulated bridge mounted on the projecting end of the plunger and terminal points in the no-voltage release circuit."

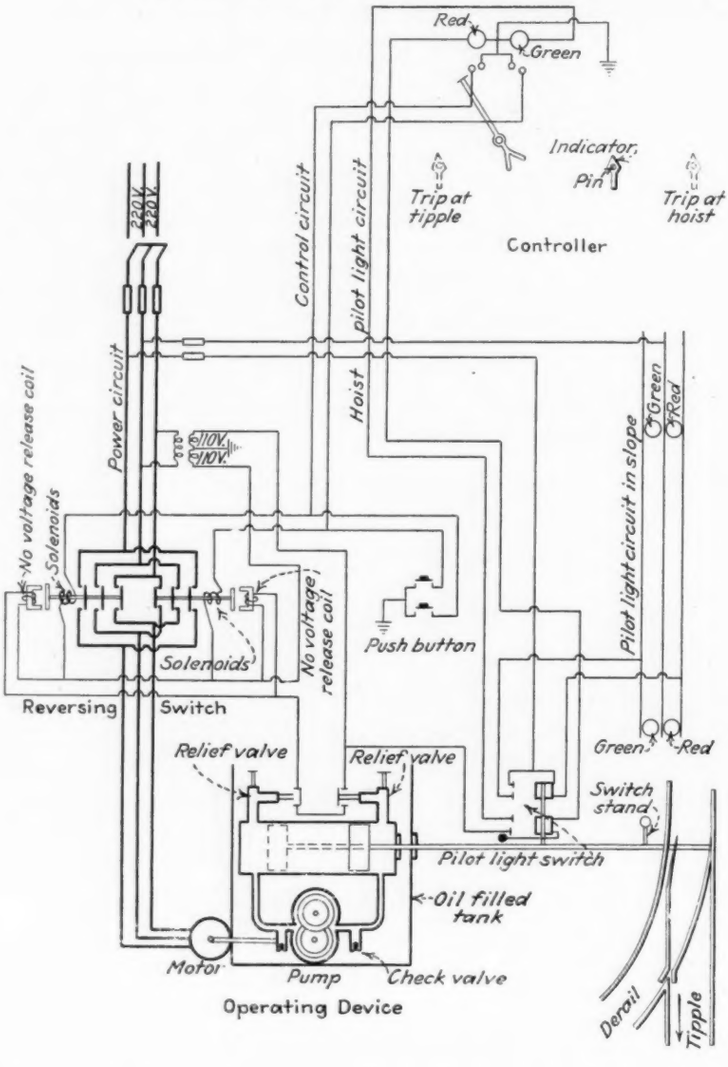
Any leakage of oil past the relief valve is allowed to escape, without pushing out the plunger, through a $\frac{1}{16}$-in. hole in the wall of the discharge pipe. This hole is exposed when the plunger is in the normal position. In case the pump has not stopped running after the plunger has been fully extended, the full discharge of the pump is allowed to escape through a second and larger hole, which is exposed only when the plunger is extended.

A push-button control, installed at the switch, permits electrical operation of the switch regardless of the automatic control. The closing of the push-button circuit renders the automatic control inoperative. The switch also may be thrown by hand (a switch stand being provided for the purpose) by disconnecting the piston rod from the switch bridle.

Current is taken directly from the 220-volt circuit for the track-switch operating device and for the pilot lights along the slope and at the tipple. For the control circuits and the pilot light at the hoist, it is stepped down through a 200-watt insulating transformer to 100 to 220 volts, with the middle point grounded.

"The reversing switch is a standard magnetic three-phase switch with its no-voltage release coils connected in a separate circuit. The pump is an oil-circulating pump from a Chevrolet automobile, direct-connected to a G.E.

Fig. 2—Diagrammatic Sketch of Derailer Layout



Type R.K.T., ¼-hp., 1,725 r.p.m., 220-volt three-phase motor. The operating cylinder was made from a sleeve bearing casting and is 2½x4½ in. The relief valves were made from ¼-in. angle globe valves."

As the derailer is controlled by the hoist, it cannot be thrown for the tipple until the rope is paid out to the point indicating safe arrival of the entire trip at the operative position, 300 ft. above the tipple. Should any cars break away from the trip, or all cars leave the rope, they will be derailed.

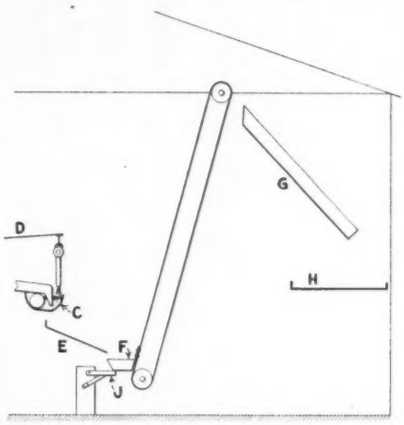


Fig. 3—From the Tempering Trough To the Storage Table

Factory Principles Reduce Labor Of Bit Sharpening

AT insignificant cost, the operation of a roller machine for sharpening mining machine bits at the Ansted (W. Va.) mine of the Gauley Mountain Coal Co. has been arranged to eliminate incidental hand labor and make the job easy and pleasant for the operative. The auxiliary appliances were assembled chiefly from scrap materials by Alonzo Zimmerman, blacksmith, whose duties include bit sharpening. Fig. 1 shows his typical pose while operating the machine.

First of all, he did the thing which is a fundamental principle in factory work for jobs which do not require walking about—he provided a comfortable seat. This seat is one from a discarded farm implement, and it is mounted on a ball bearing that was retrieved from its way to the scrap. The regular foot treadle for starting the roller into motion was too low for manipulation from this position, so the hand lever *A* was added.

For convenience in reaching the bits, the heating forge had to be placed so close to the operating seat that the radiated heat was disagreeable. To obviate this in a measure, a door or shield, *B*, was added and this supported by a chain connected indirectly to the machine operating lever. Thus the door is automatically closed when the rolling of a bit is started and is opened when rolling is finished. This arrangement provides intermittent shielding of the heat from the operative.

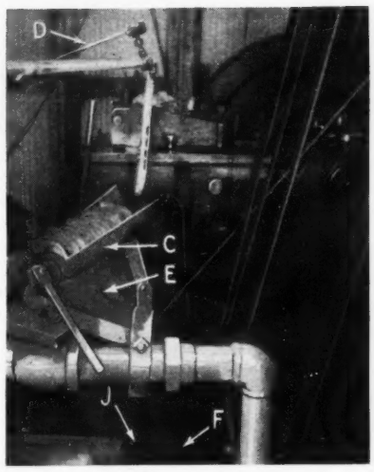


Fig. 2—Sharpened Bits in the Hardening Trough

As a bit is taken from the machine, with the cutting end still at a dull red heat, it is placed on the hardening rack, *C* (Figs. 1, 2 and 3). By the lever *D* a flow of water is regulated to immerse the bit points to the correct depth. When the hardening rack is filled with bits it is dumped by a foot treadle, and the finished bits slide down chute *E* into the elevator bucket, *F* (Figs. 2 and 3).

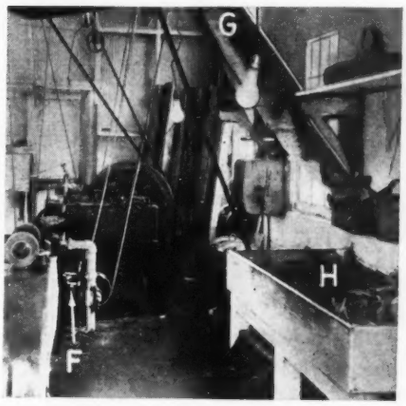


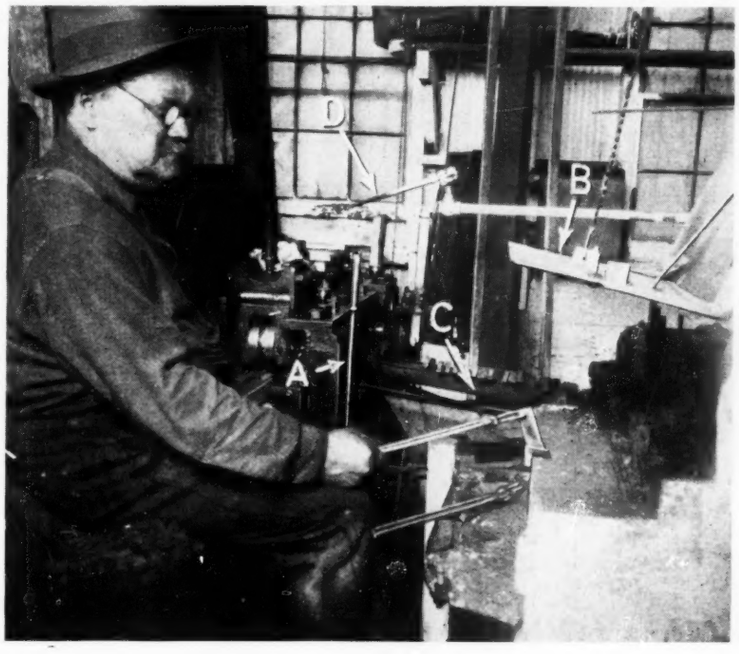
Fig. 4—Finished Bits Land on the Table

The operative then pushes another foot treadle which engages a clutch on the countershaft located overhead and starts the belt to which the bucket is attached. As the bucket goes around the top pulley the bits are thrown into chute *G* (Figs. 3 and 4), from which they slide onto the storage table *H*.

After the belt makes a complete revolution the clutch pedal is released and the bucket settles back onto the stop *J* (Figs. 2 and 3), which is hinged so that the bucket can push it out of the way in coming up.

Judged by the old standards of coal mining, there could be "no excuse for all of these conveniences for the bit sharpener." Not so now that the industry has accepted the principles of efficient production. Man power is recognized as an expensive item which justifies almost any device to eliminate or reduce physical effort.

Fig. 1—When He Steps on a Lever the Finished Bits Are Conveyed to a Storage Table



THE BOSSES TALK IT OVER

Foreman Training— Theoretical or Practical?

"WHAT did the Old Man say, Jim, when you suggested starting a worker training course?" asked Mac of the super during a walk homeward.

"I explained my ideas to him. Told him why it was needed—that our new machines are changing methods and creating entirely new jobs. It hit home, all right, Mac; but in a way I didn't expect. Dad merely looked at me and quietly said: 'Bosses need training on a new job before they can train workers.' "

"Meaning which?" questioned Mac.

"We are going into training ourselves."

"A good idea, Jim. I need some brushing up in mathematics, chemistry, and such things. Several of my assistants are anxious to go through a study of these subjects."

"You've got the wrong slant on what the boss means, Buddy. No math in this course, or chemistry either. Our training will be much closer to the job than that. The Old Man figures on putting us through a course of job processes. He is talking of waste elimination—in labor, time and materials. We are going into the keeping and analysis of costs; we're going to study individual jobs, by ourselves, and as a group. That's the substance, but there is more to it."

"Looks like we'll study right on the job, and master the loose ends during off hours."

"Exactly."

"When do we start?"

"Right now. He wants us to help set up the machinery for the practical end of it. He said he would attend to the matters now over our heads himself."

WHAT IS YOUR STAND?

1. *Do you approve of the Old Man's stand?*
2. *What specific suggestions, based on experience, can you contribute to the plan?*
3. *How should the course be conducted and what should be its scope, from your viewpoint?*
4. *Should Mac have insisted on the institution of a theoretical course?*

All superintendents, foremen, electrical and mechanical men are urged to discuss the questions on page 256. Acceptable letters will be paid for ▶▶▶▶

WHAT IS THE BEST SYSTEM for controlling the elimination of dirty cuttings and other refuse before or during loading? This problem scratched the heads of Mac and Jim in March. How the readers of *Coal Age* would solve this problem is told in the letters following.

Dirty Coal a Persistent Evil

FAR BEYOND the rim of present memory the cry of "dirty coal!" has echoed and re-echoed and, like the poor relation, bids fair to be ever with us. Every artifice known to man has been tried to insure merchantable fuel, but little or no progress has been made. Threats and entreaties yield the same result, and now it is time to take stock of the conditions as they actually are. But before saying anything more, let's count a hundred together. With the introduction of the loading machine, the condition has been considerably intensified, causing several mines in the sovereign State of Illinois to ditch 'em without further preamble.

Mac's trouble seems to be in the loading of streaky coal and sulphur bands. A vigorous docking system on the tipple has been known to get some temporary results. But the search for a better method seems to point to the room-boss explaining to the loader the bread-and-butter necessity for the utmost vigilance on the part of all concerned. This question of impurities is one of the major problems confronting our industry today, and were track-mounted machines in general use, I believe the nub of the difficulty would be exposed. But track-mounted cutting machines are not in general use and the nub refuses to show its nose. At least, it is hard to see from the present perspective. The breast and shortwall machines are with us in the vast majority of cases, and the coal corporations that have invested extensively in these machines will be "from Missouri" till they can view things from a different angle. And they see red when dirty coal is mentioned. What are we going to do about it?

The cutting machine, of course, is largely responsible for the condition, for a surprisingly large proportion of the cuttings conceal a goodly measure of fireclay. In any case, the mechanical loader has contributed but little to the cause, though the effect is herein more pronounced owing to the speeding-up of all operation, with a corresponding increase in the output per man employed.

Take a railroad car of mine-run coal and look it over as it leaves the loading boom. Follow it to its destination, say two or three hundred miles distant, with a shower of rain for good measure, and you'll find that scarcely perceptible particles of fireclay have assumed the proportions of a bushel basket. My humble opinion is that this is the BIG end of the impurities problem today, and its solution will result in much lessened blood pressure, and make a few happier homes.

The track-mounted cutting machine seems to be the best way out, for there is no question that the present method of cutting near the floor will have to be abandoned. The mechanical loader has focused the attention of all connected with the industry on the urgent necessity of a mechanical means of solving the problem, and the genius that has given us the loading machine with the one hand, offers us the track-mounted cutter with the other. From a dollar-and-cent standpoint it is a hard pill to swallow, but it means this or putting the slack or bugdust in the gob.

With the speeding-up coincident with mechanical loading, more picking on tables and adequate personnel under constant supervision at the tipple, with daylight to aid, seems indicated. But Mac's problem is not so much. He should take a walk around the rooms, and rehearse the riot act in seven different languages, injecting a little choice profanity for good measure. And the mine whistle each evening will lull him to sleep. ALEXANDER BENNETT.

Panama, Ill.

Pass It On!

Problems of management in the mining of coal now, more than ever, occupy the attention of officials whose job it is to get out the tonnage day after day. New questions come up every day and the mine boss must be on his toes to do the very best job. The world moves and it behooves the wide-awake man to keep in step with the times.

This month Mac and Jim come in contact with the question of training—not training of workers, but training of bosses so that they may teach workers—a subject of vital interest to all. Your thoughts and your experience will be of inestimable value to others. Send them in today.

Education Plus Penalties Yields Larger Amount of Clean Coal

THE BEST WAY to keep coal clean in a dirty seam is to load the machine cuttings separately, paying the loader so much a car for the work. In addition, a close check should be kept to see that the ordinary quantity of bugdust comes out of each place every time it is cut, and that it is separately loaded for shipment. If cuttings from a dirty seam are shipped with the mine-run coal, the ash content may go up much higher than the customer expects. Another means of insuring the clean coal the present sensitive market requires is some means of sampling the cars as they come from the mine. Where picking tables are used, this can easily be done by cleaning the dirtiest cars. At the end of the shift, the loaders sending out coal with the most impurities can be singled out and laid off for a certain time, the number of days to be determined by the quantity of rock and slate.

If the mine is not equipped with a picking table, the dumpers should be instructed to pick out for sampling cars which appear to contain a large quantity of refuse. If the miner finds that his coal is to be inspected, he naturally will use more care in loading. Showing the miner that clean coal means more sales and better working time is one of the best ways of enlisting his interest. The average loader thinks that anything that can be shot down between roof and floor can be sold for a fortune, and the quicker he is disabused of this idea, the better it will be for both him and the operator. Telling the average loader that coal sells for less than $10 or $15 a ton usually causes him to think you are boosting the operator's side of it, for to most loaders, the average coal mine is a mint in disguise. Loaders should be encouraged to appreciate inside information on sales prices.

HOWARD LONG,
Assistant Mine Foreman,
Davis Coal & Coke Co.,
Pierce, W. Va.

Good Cleaning Plant Necessary

DIRTY COAL is not always the fault of the loader. A large majority of the times, it will be found to be the fault of the cleaning plant. In order to load clean coal, Mac should select his most experienced man and give him authority to see that the kerf is cleaned and the bottom scraped to remove all material not fit to load. In addition, the loaders should be notified that the bottom is to be cleaned without any urging on the part of the management. The supervisor appointed by Mac would do well also to keep track of the

cutting machines. Probably he will find that the use of daymen for cutting will insure more attention to the job and cleaner coal.

After taking steps to see that refuse is removed as thoroughly as possible at the face, the next step is the examination of the cleaning plant. If the coal is not fit for shipment after it goes through the plant, it is a good sign that the latter is not rightly equipped for the job it has to do. JOHN J. CHIRE.

Hazleton, Pa.

Certain Fundamental Rules Govern Coal Preparation

THERE are certain fundamental principles in the preparation of coal which must be adhered to regardless of whether it is mechanically prepared or passed over a hand picking table. Preparation begins at the face and does not end until the railroad car is pulled away from the tipple. Close inspection should apply all along the line. Very few seams of coal possess characteristics which permit indifference to certain cardinal principles in taking care of roof, bottom, partings, or impurities within the coal itself.

One of the most prolific sources of dirt in coal—slack specifically—is machine cuttings, usually resulting from cutting in the bottom, or into the middle-man where turret machines are used. In some cases, thin bands of impurities appear in the bottom and are thoroughly mixed with the coal in cutting. The proper classification of dirty bugdust from any of these sources is refuse, and it should be treated as gob or slate and disposed of. The most practical method of classification is an inspection of all the places immediately after they are cut. A record should be made of the results of such inspection in the daily report of the inspector, and the section boss or assistant should instruct the loader to handle dirty cuttings as refuse.

Closer supervision and care in cutting and cleaning the kerf will minimize the danger of mixing these cuttings with the coal. In mines where a considerable quantity of refuse must be disposed of, accumulations of gob often overrun the working places and seriously hamper the loader in cleaning his coal. Where such conditions obtain, the foreman should have the waste loaded out. A safe rule to follow is the establishment of a gob line, two cuts back from the face. This line should be conspicuously marked on each rib following the clean-up. Loaders should then be required to keep their faces clear and their floors clean of all refuse. To economize on space, the management should insist that slate or gob be packed or walled evenly to the roof.

Many mines still follow the practice of stowing gob on either side of the track, necessitating its removal when pillars are mined. This condition renders it almost impossible to load clean coal from pillars, for in some cases there is no place where it can be moved to get it away from the face. If the management does not provide conditions favorable for loading, it need not expect clean coal from the miner.

I do not believe that a successful control system can be built up around face sampling, but favor, instead, frequent and intensive inspection of the working place. Random inspection of the cars will yield no real relief, as the loader usually is intelligent enough to cover up his dirt. For loaders who persist in including refuse, I suggest instead of docking that the cars be placed on the side-track and that the miners be instructed to clean the coal, under penalty of losing the car as refuse. In some fields, this has proved a very effective way of controlling the situation. Repeaters should be discharged. H. A. McCOY.

Stanaford, W. Va.

Publications Received

Coal Mine Mechanization—1929 Year Book of the American Mining Congress, Washington, D. C. Pp. 390, illustrated. Price $3.

Analyses of Kansas Coals. Bureau of Mines, Washington, D. C. Technical Paper 455; 49 pp. Price, 10c.

Activity of the Holmes Safety Association in Reducing Accidents in Alabama, by C. E. Saxon and C. W. Owings. Bureau of Mines, Washington, D. C. Information Circular 6227; 7 pp., illustrated.

Advanced Mine Rescue Training: Part II, Instructions in Methods of Sampling and in the Use of the Bureau of Mines Portable Orsat Apparatus for Analyzing Mine Gases, by W. P. Yant and L. B. Berger. Bureau of Mines, Washington, D. C. Miners' Circular 34; 89 pp., illustrated. Price, 20c.

Safeguarding Electrical Equipment Used in Gassy Mines—European Practice: II, Belgium, by L. C. Ilsley, Bureau of Mines, Washington, D. C. Information Circular 6135. Pp. 8.

The Relative Inflammability of Coal Dusts: A Laboratory Study, by A. L. Godbert and R. V. Wheeler. Safety in Mines Research Board. Paper No. 56; 26 pp., illustrated; price, 6d. net. H. M. Stationery Office, Adastral House, Kingsway, W.C. 2, London, England.

Pocahontas County—Detailed report by Paul H. Price, West Virginia Geological Survey, Morgantown, W. Va. Pp. 531, illustrated; accompanied by a separate case of topographic and geologic maps. Price, $3.00.

Mine Explosions in the United States During the Fiscal Year Ended June 30, 1929, by D. Harrington and C. W. Owings. Bureau of Mines, Washington, D. C. Circular 6,178; 15 pp.

Colorado Mine Fatalities, by E. H. Denny, C. W. Owings and D. Harrington. Bureau of Mines, Washington, D. C. Circular 6,177; 11 pp.

Loading Inspectors Insure Removal of Machine Cuttings

A FEW YEARS AGO I was made superintendent of two mines where the coal was 9 ft. thick and had a soft slate band 10-12 in. thick near the middle. Cutting was done under the slate with a turret machine, the slate band sometimes falling after the cutter bar was removed and sometimes requiring the use of a bar on the part of the miner. After the machine had cut the coal, the miner would clean out the cut with a hook bar and a scraper, and gob the cuttings. When the job was done to his satisfaction, he shot down the top coal and loaded it out, following with the bottom bench. These operations were given a casual supervision by the mine officials.

That the supervision was entirely inadequate was strikingly shown a little later. The company obtained a very satisfactory contract upon giving guarantees as to low ash and cleanliness in general. But after a few shipments, a bomb burst in the form of a letter saying that "the coal is not as represented, containing too much ash and other refuse, and unless the same is shipped to specifications, the contract will be cancelled." Something had to be done at once. A round-table conference elicited several propositions and one—providing for an inspector for every ten working places—was adopted.

Brushes with long handles were supplied the miners, in addition to the hooks and scrapers. The duties of the inspectors were to supervise the cleaning of the cuts. Miners were not allowed to bore shotholes until the kerf had been thoroughly cleaned and approved. The cut was thoroughly swept, as well as the face from roof to floor and the floor itself. Refuse resulting from these operations was gobbed and then the place was ready for inspection. Any miner who objected to these rules was discharged. By perseverance and strict discipline, we were in a short time shipping according to specifications, to the complete satisfaction of our customer.

Hagerstown, Md. A. E. THOMAS.

Good Bosses Insure Clean Coal

TO GET the most clean coal, the assistant foremen, firebosses and shotfirers should follow the definite policy of looking into a man's car every time they go into his place. In doing so, they will get a check on every man who is loading impurities. At the end of the shift, the names and numbers of each of these men should be reported to the mine foreman. Guilty loaders should be penalized, and dismissal should follow further infractions of the rule. In addition to the work of the sub-foreman and others, the dumper on the tipple may be instructed to keep his eye open for dirty cars, and he usually will get the

ones the others miss. The names and numbers of the men loading dirty coal and the section of the mine they work in should then be posted on the bulletin board every day. This should be followed by a campaign to foster competitive spirit between sections, with the object of seeing which section can load the cleanest coal.

Shotfirers may be instructed to report all men who fail to load machine cuttings in cars by themselves. Each loader also should be furnished with a separate check number for bugdust cars. The motorman may then report the number of cars and the sections they were hauled from as an accurate check on the origin of the cuttings and the men who loaded them. All of this means efficient organization on the part of operating officials, as well as strict discipline and impartiality.

EARL W. DICKINSON,
Assistant Mine Foreman.
West Brownsville, Pa.

Cleaning-Plant Installation Will Settle Clean Coal Question

THE "SUPER" is right. If they all fail to get clean coal, the last hand to take charge will be the receiver's. I suggest that a docking system be started right away, docking each car in proportion to the time necessary to clean the coal. This should be done three times with each loader, and then if he fails to keep his coal clean, he should be discharged. It is better to fire a few loaders, rather than to shut the mines down.

The above probably is the best system to apply to the loaders, but to really clean coal, the best agency is a washery. I feel certain that if more operators were to install plants, their sales would be larger and more permanent. This method, more than any other, would settle the question of dirty coal forever. Of course, co-operation between the officials and the men at the face will go a long way toward solving the problem.

S. J. HALL.
Stickney, W. Va.

Responsibility for Dirty Coal Rests With Mine Management

IN CONSIDERING the question of dirty coal, it must first be remembered that the customer buys fuel and not impurities. If one company's product is not satisfactory, he naturally will turn to another where his wants will be satisfied. The quantity of refuse will vary from seam to seam and even from section to section in a single mine, but what concerns us is the quality of the coal from a particular seam with the same general characteristics.

Dirty coal may result in several ways, the chief of which is lack of diligence on the part of the mine employees and mine managers. The operators, especially, should delve thoroughly into the question of improving the quality of their product, so that their own property will not be the first to go to the wall, and, in addition, should adjust their management policy to insure adequate and fair supervision of the loading.

As to the methods to be followed in keeping machine cuttings with a high ash content out of the coal, the undercut should be made in the fireclay wherever practicable and the cuttings gobbed. The machine men get their usual reward and the company gets more of the seam in the form of larger size. The responsibility for seeing that such cuttings are not included in the coal rests with the company men. Full control will not result from a policy of face sampling, but more interest in the actual method of mining at the face will go far toward reducing the quantity of refuse loaded out. Random courtyard inspection of cars would be all right, if made thoroughly and in all fairness to the miners.

Certain docking rates, if applied without prejudice, probably are the best means of governing employees. Operators, however, should get away from the discharge idea and look more toward good will and co-operation for a solution to the problem. It is too much to expect miners to get all the refuse out of the coal they load. I would say that no docking should be done if the quantity of refuse per car is less than 50 lb. For 50 lb. the miner should be fined 25c., with an additional penalty of 1c. for each pound over 50. To enforce such a policy, a picking table should be used, as flat dumping leads to errors and unfair assessments.

Linton, Ind. W. H. LUXTON.

Old Problems Still Intrigue

Letters on the problem of keeping an extra haulage crew on the payroll, discussed in the February issue, and on the question of age-hiring limits, raised in January, still come in. Recent letters on these two phases of coal mining appear below.

Systematic Training of Extras Makes Haulage Most Efficient

DEAR JIM: I note the Old Man is after you and Mac about the irregular performance of your motors. Conditions are so varied in the coal-mining industry that it would be impossible to offer a panacea for your troubles applicable to all mines under all conditions. However, as I experienced the same trouble, I am going to tell you how to overcome it.

First we made a thorough analysis of the situation and found the following reasons for failure in haulage performance: locomotive failures and interruptions, 25 per cent; motormen laying off, 30 per cent; brakemen laying off, 45 per cent. In carrying the analysis still further, we found that locomotive failures were primarily caused by lack of systematic inspection. Motormen usually were missing because they desired to load coal on account of the greater remuneration, and brakemen were afraid of the hazards, especially where high-speed locomotives were used.

To guard against motor failures, we require a daily inspection by the motor runners, this inspection to include controllers, brake rigging, and sanding apparatus. It is followed by systematic and thorough oiling. The motorman must go into the controller, examine it, and test it for loose or burned fingers or segments. These are then adjusted, filed, and greased. We found that most of the locomotive troubles resulted from lack of care of the controller.

Hazard to the brakemen was eliminated by changing to slow-speed locomotives, which was done by removing the parallel segment from the reverse cylinder of the original machines to make them run entirely in series. The speed was thereby cut in half, reducing the hazard to brakemen 80 per cent; power cost, 14 per cent; and maintenance, 80 per cent. In addition we no longer have trouble getting men for the job.

The system works as follows: John is running a motor, but wants to load coal. So we tell John to teach his brakeman to operate a locomotive and promise him a place as soon as his assistant is competent. John uses his spare time in teaching the "brakie," and then for week the "brakie" runs and John brakes. If the "brakie" shows he can haul coal as well as John did, and can pass a test on the care and maintenance of his machine, John is given a place on the section where he used to haul, with the understanding that he will take the place of either motorman or brakeman if called upon. Then a new man is put to braking. The latter is picked with an eye to his development into a motorman in the future.

In the course of time you will have made your own motormen and brakemen, and will have experienced men working in every section who are thoroughly familiar with it. In case any of the regular crew lays off, haulage will go on without any drop in tonnage. Neither will you be required to load up with extra day men. There is no added cost, but the plan does require a little time and foresight on the part of the operating officials.

R. G. STEVENS.
Beards Fork, W. Va.

Train Reserves From Mine Force To Man Haulage Locomotives

THE OLD MAN has a perfect right to raise Cain about the motor performance, especially when the tonnage on one machine is cut in half. Naturally, the cost is increased considerably, simply because the regular crew took a holiday. A good method of keeping an extra motorman on hand is to have the regular runner teach his brakeman the job. He can easily find time for the necessary instruction without decreasing the tonnage hauled, especially if he is well acquainted with his territory.

Trip riders who are to be used as extra motormen should be shifted about frequently, so that they may become familiar with all the territories. For extra trip riders, the foreman may call on the loading force. There are always young men loading coal that want to learn to ride trips and run motors. The foreman, with a little extra effort, can always have a man in each territory to take charge of the haulage. In addition, taking him from loading will not make nearly as much difference in tonnage as will result from a motorman or brakeman laying off. I do not advocate carrying extra shift men to fill in, as they materially increase the tonnage cost on days when they are all on the job.

R. A. BARTLETT.
Eldorado, Ill. *Manager.*

The Fable of the Extra Crew

"ONCE upon a time," as the stories go, there was a mine, an Old Man, and a main-line motor crew. Once a week this main-line motor crew found that pressing business matters demanded their attention; furthermore, these business matters necessitated laying off. The Old Man had a thought, a most brilliant thought, which he confided to the "Super." The sum of this thought was that a wire crew could be hired, one of the crew to be able to run a motor, and the other to be able to fill a brakeman's shoes. The "Super" instructed the mine foreman to employ these extra men; the instructions were carried out, and the problem was solved.

But as time went on, it developed that the wire crew also had "pressing" business matters to attend to, these matters coming to a head on Saturdays and at the first of the half. Close study brought to light the fact that when the main-line motor crew was off, the wire crew also was off—strange coincidence. So the Old Man had another thought, not so brilliant, perhaps, but practical. One fine morning, the mine foreman was called to the outside; also the main-line motor crew; also the wire crew. A little note from the chancellor of the exchequer was handed to the motor crew; also the wire crew. And the mine foreman was instructed to get the coal out without the assistance of the late lamented wire and motor crews, and to get it out just as cheaply, just as safely, and in his own way.

So this mine grew and grew; it became the most safe and efficient; and had the smallest labor turnover in the field. Perhaps the experience with the wire crew and motor crew had nothing to do with the fine record rolled up as the years went by, but—never again were two men paid to do the work of one.

AESOP, JR.

Older Men Insure Safety

OLD-AGE limits imposed by some of our coal companies may be adopted for some useful purpose, but I fail to see what the operators expect to gain by the elimination of men over 45 years old. If first-class results are desired, and "Safety First" is to be kept as the slogan, operators assuredly will have to retain some of the older hands to show the way. The younger set do not know, and are not expected to know, the best methods of mining. Is it right for the older men to give up the reins to young fellows just out of a mining school and let them experiment with our sons' lives and our fathers' money? The answer is that it is not right, and young men should not be allowed to have charge of a mine without learning the practical lessons we have learned, and in the same way.

It seems that Mac and Jim and others have discussed the problem without arriving at a definite conclusion, but the mere fact of discussion will cause others to fall in line. As a result, some good undoubtedly will be accomplished. While I myself do not feel capable of handing out the soundest advice, I do know that only an experienced miner can safely and successfully handle any mine. And he can get this experience only by years of working in the mines. When all is said and done, it will be necessary to keep some of the older heads on the job to instruct the young ones in how to do their jobs in the safest manner.

A. H. STANSBERRY.
Chattanooga, Tenn.

Recent Patents

Miner's Lamp; 1,743,166. Charles F. Statler, Wallace, Idaho. Jan. 14, 1930.

Means for Detachably Mounting Lamps on Miners' Caps; 1,743,235. Walther Raster, Chicago, Ill., assignor to Justrite Mfg. Co., Chicago, Ill. Jan. 14, 1930.

Accumulator for Miners' Electrical Lamps; 1,743,540. W. Gosman and Max Stoeck, Dortmund, Germany. Jan. 14, 1930.

Coal Crusher; 1,744,028. George W. Borton, New Lisbon, N. J., assignor to Pennsylvania Crusher Co., New York City. Jan. 21, 1930.

Miner's Safety Lamp Indicating the Amount of Firedamp in the Air; 1,744,416. Georges Schauly, Nantes, France. Jan. 21, 1930.

Jigging Mechanism; 1,745,305. Martin J. Lide, Birmingham, Ala. Jan. 28, 1930.

Fuse for Mines; 1,745,758. Hans Gruber, Muhldorf, Germany. Feb. 4, 1930.

Mine-Hoist Signal System and Switch; 1,739,613. M. W. Russey, Los Angeles, Calif., assignor to United States Smelting, Refining & Mining Co., Portland, Me. Dec. 17, 1929. Filed May 27, 1924; serial No. 716,135.

Loading Machine; 1,739,624. David Whamond, Kittanning, Pa. Dec. 17, 1929. Filed June 4, 1927; serial No. 196,412.

Lamp-Attaching Device for Miners' Caps; 1,739,916. W. Raster, Chicago, assignor to Justrite Mfg. Co., Chicago, Ill. Dec. 17, 1929. Filed Dec. 12, 1927; serial No. 239,406.

Air-Lift Pumping System; 1,740,742. Robert E. C. Martin, Chicago, assignor to Sullivan Machinery Co., Chicago, Dec. 24, 1929. Filed Sept. 1, 1927; serial No. 216,959.

Haulage Mechanism; 1,740,702. Robert C. Osgood, Claremont, N. H., assignor to Sullivan Machinery Co., Chicago. Dec. 24, 1929. Filed April 8, 1922; serial No. 550,888.

Hoisting Mechanism; 1,740,704. Robert C. Osgood, Claremont, N. H., assignor to Sullivan Machinery Co., Chicago. Dec. 24, 1929. Filed Jan. 17, 1929; serial No. 686,908.

Machine for Rock or Coal Cutting; 1,740,761. F. J. B. Berry, Lille, France. Dec. 24, 1929. Filed Nov. 29, 1926; serial No. 151,512.

Rotary Conveyor; 1,741,019. Earl P. Harrington, Youngstown, Ohio. Dec. 24, 1929. Filed April 20, 1928; serial No. 271,526.

Flotation Process; 1,741,028. Henry T. Koenig, Oscar A. Fischer, Earl F. Haffey and A. B. Clampitt, Denver, Colo., assignors to R. H. Channing, Jr., San Francisco, Calif. Dec. 24, 1929. Filed Sept. 21, 1927; serial No. 221,136.

Trade Literature

Edison Model H Miner's Electric Safety Cap Lamp. Mine Safety Appliances Co., Pittsburgh, Pa. Folder illustrating and describing the adaptability of this lamp for both working and traveling.

Overload Switch for Small Motors. Cutler-Hammer, Inc., Milwaukee, Wis. Folder illustrating and describing this switch which is known as Bulletin 9101.

Heavy-Duty Roller Bearings. American Roller Bearing Co., Pittsburgh, Pa. Pp. 76; illustrated. Covers medium duty, heavy duty and super heavy duty bearings and contains drawings showing various methods of installation in regard to end plate construction, doweling of inner races and control of thrust.

O-Z Anemo Tachometer. O. Zernickow Co., New York City. Leaflet describing the construction and adaptation of this air velocity meter.

CP Sinker Drills. Chicago Pneumatic Tool Co., New York. Bulletin 850; 18 pp., illustrated.

Weldite Line of Welding Rods is the title of leaflet A-43, issued by the Fusion Welding Corporation, Chicago, listing the various rods.

"The Right Arm of Progress," issued by the Bucyrus-Erie Co., South Milwaukee, Wis., shows power shovels performing various tasks. Pp. 31; illustrated.

Line Material for Railways and Mines. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Catalog 234; 68 pp., illustrated.

Multiple Retort Stoker. Combustion Engineering Corporation, New York City. Catalog MR-2; 47 pp., illustrated.

Electric Tools. Black & Decker Mfg. Co., Towson, Md. Catalog No. 20; 40 pp. illustrated.

Centrifugal Pump Selection Charts. Goulds Pumps, Inc., Seneca Falls, N. Y. Bulletin No. 200; 40 pp., illustrated. Besides these charts, which show the efficient range of 26 different suction pumps at five different speeds, description of the Goulds line of horizontally split, inclosed-impeller, single-stage, double-suction pumps is included.

Vibrating Screen. Stephens-Adamson Mfg. Co., Aurora, Ill. Pp. 16, illustrated, containing construction details, dimensions, capacity data, etc.

Flexible Couplings. Morse Chain Co., Ithaca, N. Y. Bulletin No. 37; 23 pp., illustrated. Outlines the uses and advantages of these couplings, gives data on how to select them, their ratings, dimensions and prices.

Texrope Drives for Every Industry. Allis-Chalmers Mfg. Co., Milwaukee, Wis. Pp. 27, illustrated.

AMONG THE MANUFACTURERS

CHICAGO PNEUMATIC TOOL Co., New York City, has opened a branch office at 327 Philcade Building, Tulsa, Okla., under the direction of George J. Lynch, to handle the sale and servicing of the company's products. An office has been opened also at 1 West 16th St., Oklahoma City, Okla., for the sale and servicing of the CP Tucone rock bit.

* * *

FRANK J. BURD, formerly in charge of the steel mill division of Cutler-Hammer, Inc., has been made manager of the Philadelphia (Pa.) office of the company, vice T. E. Beddoe, resigned. M. C. STEFFEN, formerly stationed in St. Louis, Mo., has been made manager of the Cincinnati (Ohio) office, succeeding R. I. Majeur.

* * *

TRUMBULL ELECTRIC MFG. Co. has removed its New York City office to 60 East 42nd St.

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COMBUSTION ENGINEERING CORPORATION, New York City, announces the removal of its Hazleton (Pa.) representative, the Coxe Stoker Engineering Co., to 1109-1114 Markle Bank Building.

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F. E. HARRELL, a member of the engineering department of the Reliance Electric & Engineering Co., Cleveland, Ohio, has been appointed engineer in charge of drafting and experimental departments.

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HENDRICK MFG. Co., Carbondale, Pa., has removed its Pittsburgh (Pa.) office to the Koppers Building.

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G. L. DRAFFAN, W. A. SPRINGER, and J. M. STRICKLER were elected secretary, treasurer, and general sales manager, respectively, of the Ohio Brass Co., Mansfield, Ohio, at the annual directors' meeting. Mr. Draffan was formerly general sales manager; Mr. Springer, as assistant to the treasurer, was active in the forwarding collecting of export shipments, and Mr. Strickler held the post of assistant general sales manager.

* * *

ROLLER-SMITH Co., New York City, has appointed the Henry N. Muller Co., Pittsburgh, Pa., as its district sales agent in western Pennsylvania, eastern Ohio, and West Virginia.

YALE & TOWNE MFG. Co., Stamford, Conn., has opened an office for the sale and servicing of the Yale line of electric industrial trucks, tractors, trailers, Stuebing hand lift trucks and skid platforms in New York state at Syracuse.

* * *

C. H. JENSEN, formerly with the Byllesby Engineering & Management Corporation, has joined the engineering staff of the Copperweld Steel Co., Glassport, Pa.

* * *

WELLMAN ENGINEERING Co. is the new name of the Wellman-Seaver-Morgan Co., Cleveland, Ohio, approved by the stockholders at the annual meeting on Feb. 18. No change was made in the membership of the board of directors or in the officers of the company.

* * *

AMERICAN ASPHALT PAINT Co., Chicago, has opened new offices at 393 Seventh Ave., New York City, and at Houston, Texas. The new plant at Kankakee, Ill., is now in production to serve the Middle West.

* * *

ATLAS CAR & MFG. Co., Cleveland, Ohio, has appointed J. Q. Lalor, Denver, Colo., previously connected with the O. H. Davidson Equipment Co., as agent for handling its line of electric and storage battery locomotives in Colorado and northern New Mexico.

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P. LOYD MORRIS, manager of the Kansas City (Mo.) branch of the Wagner Electric Corporation, St. Louis, Mo., has been transferred to the home office, in charge of the merchandising division.

* * *

H. N. MATHIAS and V. F. COVERT have been elected assistant auditors of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Mr. Mathias joined the Westinghouse company in 1899 and rose to the position of supervisor of costs and budgets before promotion to his present capacity. Mr. Covert went to the organization from the old E. M. F. Motor Co., Detroit, Mich., in 1911, and, before elevation to his present position, was supervisor of district accounting.

MORRIS MACHINE WORKS has removed its Chicago office to the Builders Building, 228 North LaSalle St.

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JOSEPH J. MULLEN, formerly condenser specialist in the New York City office of the Elliott Co., Jeanette, Pa., has been made New York manager.

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A. E. MOELLER Co. has been succeeded by the Moeller Instrument Co., Brooklyn, N. Y.

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RELIANCE ELECTRIC & ENGINEERING Co. has moved its Pittsburgh (Pa.) office to 2300 Koppers Building, and has established an office at Toledo, Ohio, to serve northwestern Ohio, northern Indiana and southern Michigan. S. B. TAYLOR, engineer in charge of drafting for the Reliance company, has been promoted to assistant works manager of the Cleveland, (Ohio) plant.

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R. G. RICHMOND has resigned as president of the Waterbury Co., New York City, after 25 years of service.

* * *

W. EARLE PASHLEY, advertising manager, C. F. Pease Co., Chicago, has been appointed assistant sales manager and second vice-president. In addition, Mr. Pashley was elected to the board of directors and will continue to handle the advertising and promotional activities of the company.

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FREDERICK ALAN SCHAFF, vice-president of the Superheater Co., New York City, has been elected president, succeeding GEORGE L. BOURNE, who becomes chairman of the board.

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A. F. MARWICK, formerly general sales manager, Pettibone-Mulliken Co., has joined the Chicago district sales office of the Taylor-Wharton Iron & Steel Co. and Wm. Wharton Jr., & Co., Inc. G. V. WOOD has been made western sale manager for the company, with headquarters at San Francisco, Calif., and J. R. VAN RENSSELAER, formerly at San Francisco, has been moved to the New York City office.

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E. E. LEVAN and J. H. MAGUIRE have been appointed general sales manager and works manager, respectively of the Haynes Stellite Co., New York City. Other appointments made by the company are as follows: F. T. MCCURDY, plant superintendent; J. R. BROWN, F. L. SECORD and EVERETT PAGE, assistants to the superintendent, and L. H. BROWN, research engineer.

WHAT'S NEW
IN COAL-MINING EQUIPMENT

Lightness and Compactness Claimed for Blowpipe

The Oxweld Acetylene Co., New York City, has introduced the Type W-17 blowpipe, employing the low-pressure injector principles of other blowpipes in the Oxweld line. The company states that it is a full-sized blowpipe, large enough for any kind of welding and so carefully designed that it may be used on the finest jobs. Tip and welding head are of one-piece construction, and are combined in a long, slender stem of the gooseneck type. The injector is located in the base or handle end of the stem. Each of the ten welding heads has its own nut for attaching it to the blowpipe. The nut is so constructed that it extends beyond the injector when the welding head is detached from the blowpipe, to protect the injector from damage resulting from careless handling. A fine pitch thread makes it easy to tighten or loosen the nut without the use of a wrench, according to the manufacturer.

Special brass tubing, with longitudinal ribs, is used in the handle of the blowpipe, offering, it is stated, a sure grip, as well as reinforcing the handle. Valve wheels are said to be of new design, located so as to be readily accessible, yet out of the way during welding. With the No. 4 welding head, it is stated that the blowpipe weighs only 24 oz., and the maker claims that the thin shape of the welding heads allows it to be used in inaccessible places. The inner cone of the flame, it is said, is shorter and thicker than usual, with a tendency to ball at the end, thus speeding up welding by presenting a larger portion of the high temperature flame to the metal.

The Oxweld company also has brought out a new welding rod for making extremely strong welds in steel, designated as Oxweld No. 22 S. D. It is recommended by the company for making full-strength welds in 0.30 to 0.40 carbon steel, which has recently come into use for making pipe. In general appearance, weldability, chemical and physical properties, the new rod is similar to the Oxweld No. 1 high-test rod, and is said to produce welds having a tensile strength of 100,000 lb. per square inch.

Features of the No. 22 S. D. rod pointed out by the maker are as follows: It is a self-fluxing, deoxidizing rod which sparks very little; it forms a fusible slag that provides an extremely thin protective coating on the surface, thus preventing oxidation from the air; the composition of the rod prevents the strengthening element — carbon — from burning out during the welding operation; it has the ability to fuse easily into the base metal at both the sides and bottom of the vee, another reason for the great strength of the weld.

Oxweld Type W-17 Blowpipe

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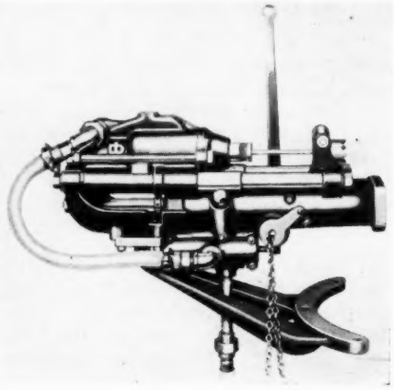
Shank and Bit Punch Offered

Ingersoll-Rand Co., New York City, has announced the 34SP shank and bit punch, designed to fit the No. 34 drill steel sharpener. Advantages mentioned are as follows: Feed cylinder, valve chest oiler, and guide holder are constructed in one piece, and the valve chest is bushed; short throw and easy reach of the operating lever greatly facilitate operations; complete lubrication is maintained from one oil chamber; stuck pins are eliminated by the positive action, which drives the punching pin out of, as well as into, the steel clamped in the sharpener during the operation; combination shank and bit guides permit handling both bits and shanks on any one steel section without changing the guides, and assure the correct alignment of the steel to be punched.



Ingersoll-Rand Shank and Bit Punch

A complete outfit, consisting of the 34SP punch attached to the No. 34 sharpener, the company says, will handle any section of drill steel up to 1⅛ in. in diameter, and will make bits up to 2½ in. in diameter.

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Welding Rod Announced

Weldite C-No. 6, fluxed, a new rod designed for carbon arc welding is now offered by the Fusion Welding Corporation, Chicago. The rod is said to be particularly applicable to the welding of mild steel plates and castings, and the company asserts that welding speeds may be considerably increased through ease of manipulating the arc, due to the fact that the influence of the flux coating causes the arc to draw from the hottest part of the weld puddle, rather than from the colder edges, as usually is the case with the carbon arc process. A very favorable application of the new rod, the company points out, is in the welding of heavy-section, mild steel, as the deposits are sound and strong. Ductile qualities of the deposit are said to make the rod especially useful in foundry work. Rail joint welding with the new rod, the maker claims, may effect substantial savings, as only one layer of metal is required, and the rod may be laid in place or held in the hand as welding proceeds.

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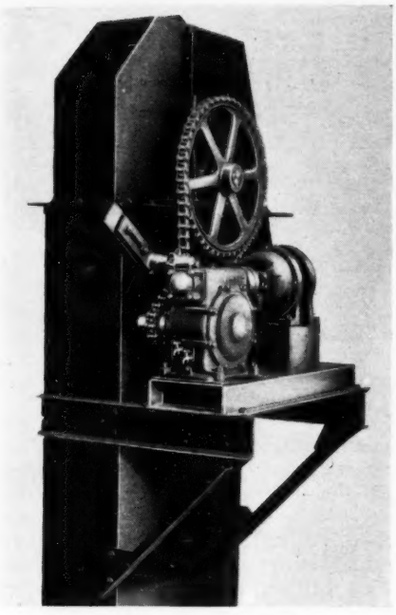
Standardized Drive Developed For Elevator Use

A standardized drive for elevators, which is said to be compact, efficient and perfectly quiet at all speeds, has been developed by the H. W. Caldwell & Son Co., Chicago. It is built to operate centrifugal discharge, perfect discharge or continuous bucket elevators requiring 3 to 15 hp.

The first reduction is made up of a fully inclosed worm gear to which a motor is coupled. Motor and worm reducer are aligned on a welded steel base, making, it is claimed, a compact assembly easily supported on the elevator casing or platform. The second



Caldwell Elevator Drive

reduction is made by a Link-Belt roller chain, which the maker claims will furnish a maximum of strength, durability, efficiency, and quietness of operation, in combination with a minimum of weight and space required. The chain also acts as a connection between the reducer shaft and the head shaft.

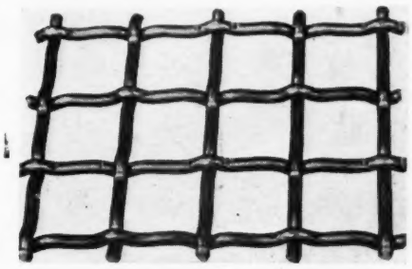
Lift-Truck Raises Load With One Stroke

A new lift-truck, known as the "Red Junior" Barrett, has been announced by the Barrett-Cravens Co., Chicago, the maker asserting that it will lift 25 per cent easier and operate 50 per cent quicker than any other lift-truck of equal lift on the market. The stroke of the handle suffices to lift any load, the makers say, from any angle. Other features claimed for the device are as follows: spring handle holdup, which prevents the handle falling to the floor and at the same time takes the weight out of the trucker's hands; roller-bearing latch catch; automatic engaging latch for lifting loads, eliminating the necessity for stepping on a foot pedal, and Hyatt roller bearings and Alemite lubrication. The capacity of the truck is 2,500 lb., according to the manufacturer, who states that it is available in 120 standard stock models.

"Red Junior" Barrett Lift-Truck

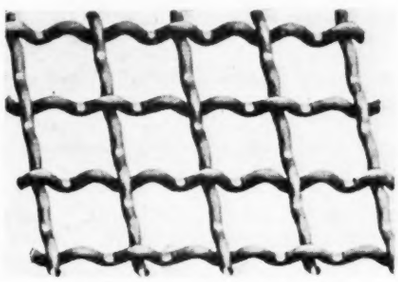
Woven Wire Screens Offered For Coarse Sizing

New products developed by the Ludlow-Saylor Wire Co., St. Louis, Mo., include the "Arch-Crimp" screen and a



"Arch-Crimp" Screen

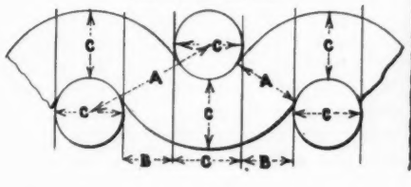
50x50-mesh, steel wire cloth made of No. 33 W&M gage (0.0118 in. diameter) wires. The "Arch-Crimp" woven wire screens are designed for coarse sizing and the company says that tension cannot stretch the crimp; the wires resist extreme abrasion, and bulging or sagging under load has been rendered impossible by the elimination of creep between wires. They are made, according to the manufacturer, for application on vibrating screens where the service is severe, or on revolving screens.



Intermediate Crimp Screen

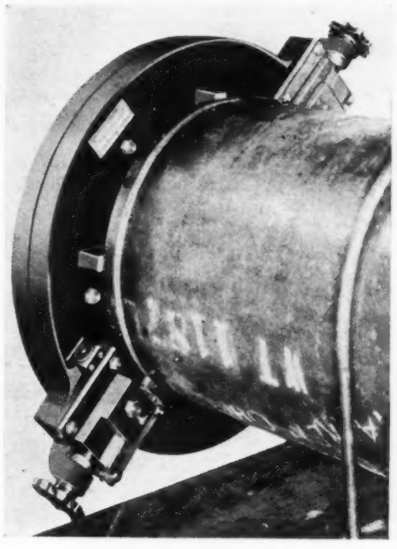
The new steel wire cloth, the company states, is the heaviest 50x50-mesh variety ever made. The diameter of the wires (0.0118 in.) is 0.0036 in. larger than the nominal opening between the wires, which is 0.0082 in. This construction is shown in the accompanying sketch, where diagonal *A*, the available space between parallel wires through which transverse wires can pass, is considerably more than *B*, the nominal opening between wires.

Screen Having Wires Larger Than Nominal Openings Between Wires



Grooving Tool Said to Cut Perfect Circle

Exclusive features claimed by the Borden Co., Warren, Ohio, for the Beaver grooving tool for "Victualic" pipe joints are that it locks on the pipe by means of an internal chuck and the cutting knives cut a groove that is perfectly circular, regardless of whether or not the pipe itself is out of round. This point, the company says, is important



Beaver Grooving Tool

because of the fact that most lengths of pipe, particularly in the larger sizes, are not circular, and any tool made to follow the periphery will cut a groove that corresponds to its contour. Then, to whatever degree the pipe end is out of round, there will be that much lack of fit between the groove and the coupling. This tool may be obtained in several different sizes for use on pipe from 2 to 16 in. in diameter.

Cylindrical First-Aid Kit For All-Purpose Use

Bullard-Davis, Inc., San Francisco, Calif., announces that they have been appointed by the Standard Oil Co. of California as licensed manufacturers of the Standard Oil first-aid kit, which will be placed on the market as the Bullard cylindrical first-aid kit. It is, as its name implies, cylindrical in shape and made of drawn aluminum. The company asserts that it can be conveniently mounted on the wall or in trucks or

Bullard Cylindrical First-Aid Kit

motor vehicles, making it possible for the user to standardize on one type of kit for all purposes. The kit, it also is stated, is durable, dustproof, waterproof, non-corrosive, and non-tarnishing.

Within the kit, the first-aid material is kept in unit packages in a duck roll-up. The roll-up, it is said, can easily be removed and carried to the injured man. Ability to see just what the kit contains and simplicity in removing the desired units are other features pointed out by the company. Roll-ups are easily and conveniently carried from place to place, it is said, simplifying and speeding up the job of maintaining the kits in complete working order, as the roll-ups can be replaced at a central point.

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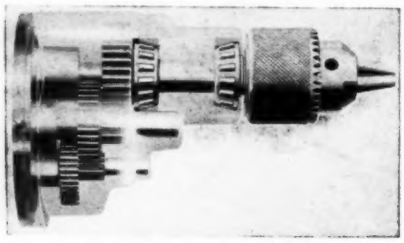
Roller-Bearing Chuck Spindles In New Drill

Improvements in the drills of the United States Electrical Tool Co., Cincinnati, Ohio, according to the company, consist of the addition of roller bearings to the chuck spindles of the $\frac{5}{8}$- and $\frac{3}{4}$-in.



U. S. Heavy-Duty Drill

heavy-duty types. Advantages claimed are that this construction provides for the double thrust which occurs in cylinder reconstruction work, increases the ease of operation, and lengthens the life of the machine.

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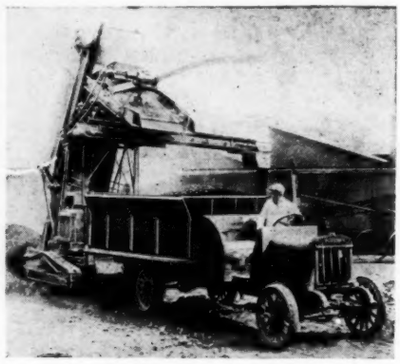
New Coke-Screening Plant Is Self-Contained

Mounted on caterpillars, the new coke-screening plant offered by the Barber-Greene Co., Aurora, Ill., is said to load and screen at the rate of $\frac{3}{4}$ ton per minute, move rapidly about the yard under its own power, perform many operations from one power source and to be easily operated by one man. It is self-feeding and consists of a combination of the Model 42 Barber-



Barber-Greene One-Man Coke-Screening Plant

Greene bucket loader and a 4x5-ft. Leahy "No-Blind" vibrating screen, with some modification of both. Cleaned coke is discharged into the waiting truck and the breeze goes to a belt conveyor which carries it to a point 9 ft. away from the machine.

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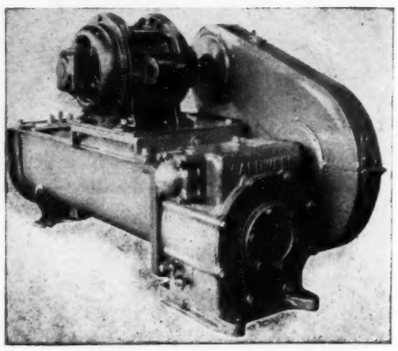
Screw Conveyor Drives Are Standardized

Pursuant to their plan of standardizing various driving mediums, H. W. Caldwell & Son, Chicago, have announced standardized drives for screw conveyors. This equipment is designed for use with screw conveyors 8 in. to 16 in. in diameter, and is said to be compact, trim in appearance, highly efficient, positive, and quiet in action. Two arrangements, Type C and Type D, are available.

The Type C drive consists of two speed reductions from motor to conveyor, each through a Link-Belt silent chain drive inclosed in an oil retaining steel casing and a worm-gear speed reducer, designed to serve as a thrust end and screw conveyor drive. Type D drive consists of a direct-coupled reducer, mounted with the motor on one baseplate. This type of drive permits the selection of a Caldwell worm-gear reducer in accordance with the horsepower rating, without regard to the size of the conveyor trough on which the drive is to be mounted.

All the reducer bearings on both types are said to be anti-friction, with



Caldwell Standardized Screw Conveyor Drive

automatic lubrication. Oversize Timken bearings on the worm-gear shaft take the conveyor thrust in each direction, it is asserted, and the drive is said to be adaptable to either horizontal or inclined conveyors, after proper adjustment of the oil levels. Standard motors of 860, 1,160, 710, or 1,340 r.p.m. can be used. Conveyor speeds of 45 to 125 r.p.m. are provided for.

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Mounted Electric Drill Said to Be Lighter

Light weight, one-man operation and low cost are features claimed for the new Spry one-man, mounted electric drill for coal-mine use manufactured by the Howells Mining Drill Co., Plymouth, Pa. The total weight of the machine is 42 lb., according to the company, which also states that it is very compactly built. The company further asserts that it will drill all kinds of clear coal at a satisfying rate of speed and that it can be used with soft slate by substituting a fine thread bar. The machine is supplied with either the single or double post for 110- or 250-volt direct current.

Single-Post Spry One-Man Mounted Electric Coal Drill